TECHNOLOGY DEPT.

PRE-CONVENTION ISSUE May, 1950

THE FOUNDRY

wherever metals are cast...

a mechanized foundry benefits *Everyone*

Consult Bartlett-Snow—engineering specialists in this work since 1914. The C. O. Bartlett & Snow Company, 6201 Harvard Avenue, Cleveland 5, Ohio.

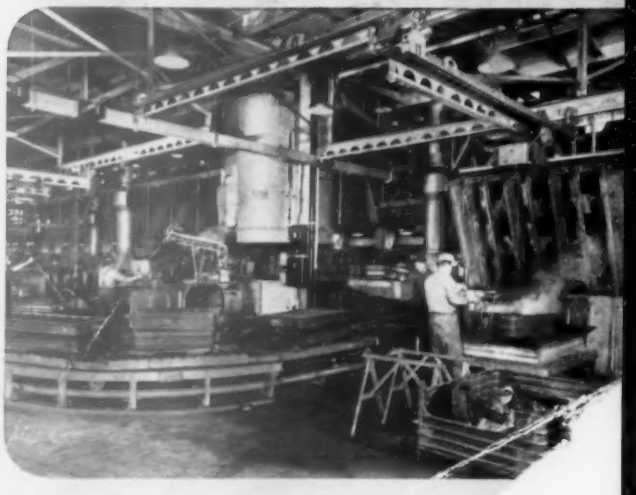
ERS

ERS

BARTLETT B-SNOW CLEVELAND 5, OHIO

FABRICATORS

ERECTORS



The Views Above Show Some o
Bartlett-Snow Equipment
Avco's New Idea Foundry, Coldw

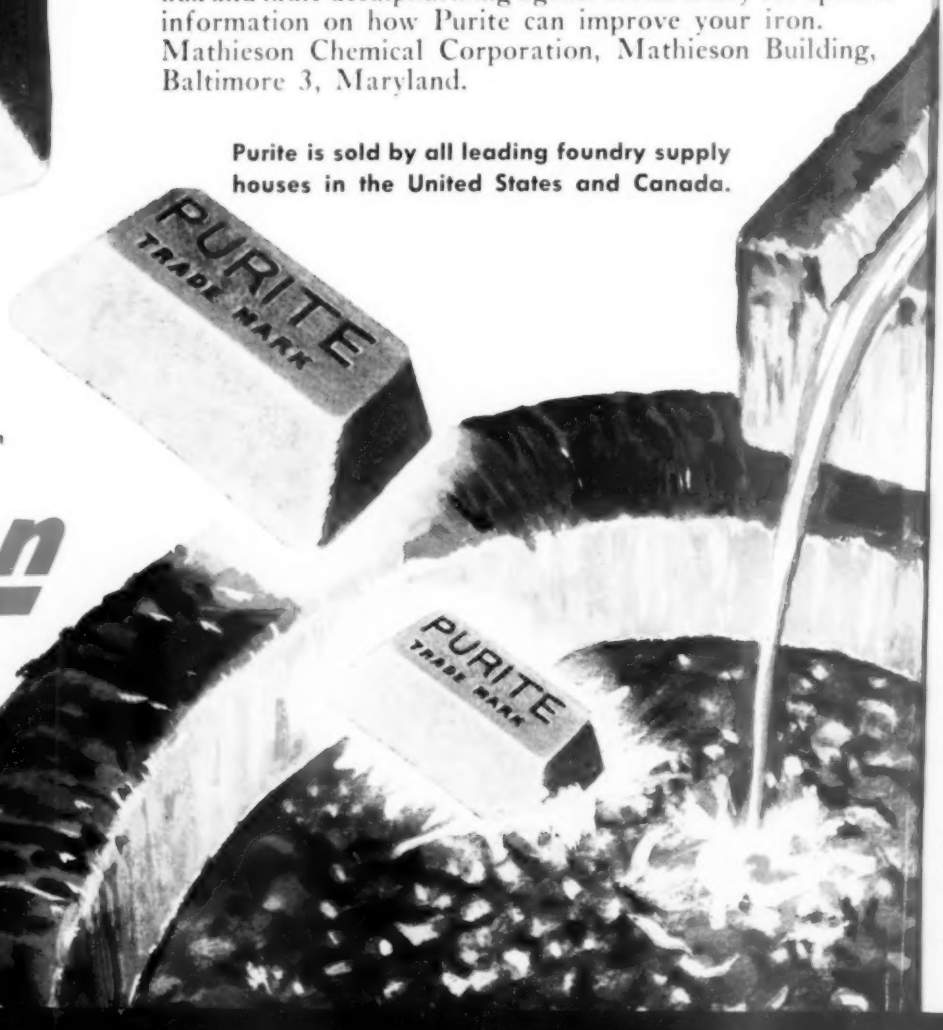
why PURITE makes IRON Cleaner · CASTINGS Stronger

When foundry after leading foundry changes to Purite and then continues to use it, you know there must be good practic reasons for the success of this economical desulphurizer and cupola flux. There are! Just note these outstanding advantages

1. **Purite gives 100% fluxing action in the cupola — 100% desulphurizing action in the ladle.**
2. **Purite gets to the iron quicker — no faster desulphurizer made.**
3. **Purite is time-tested and proven for unsurpassed desulphurizing uniformity.**
4. **Purite comes in 2-lb. pigs — no weighing or measuring required.**
5. **Purite is 100% fused soda ash—you do not pay for inert materials.**
6. **Purite does not crumble—no waste—no dust.**
7. **Purite can be shipped in bulk carloads at substantial savings over bag shipments—is easily stored without deterioration.**

These day-to-day benefits explain why leading foundries throughout the country regard Purite as the foremost cupola flux and ladle desulphurizing agent. Write today for specific information on how Purite can improve your iron. Mathieson Chemical Corporation, Mathieson Building, Baltimore 3, Maryland.

Purite is sold by all leading foundry supply houses in the United States and Canada.



PURITE 100% FUSED SODA ASH

The Scientific Flux for Better Melting and Cleaner Iron

Mathieson
CHEMICALS

SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

HOW YORK CORPORATION CUTS CASTING REJECTS

YORK CASTS THOUSANDS OF PARTS LIKE THESE IN NICKEL CAST IRON
Famous for refrigeration and air conditioning, York has installed a greater aggregate capacity of mechanical cooling for commercial use than any other manufacturer. York not only insures their high reputation by use of long-wearing Nickel cast iron parts, like those shown here, but also gains production economies through the superior machining qualities of Nickel cast iron.

A foundry producing as many castings as York Corporation can't afford a high percentage of rejects . . .

That's why York uses Nickel to keep quality up, costs down, and to minimize rejects in both the foundry and machine shop.

After testing cast irons of all types, York's engineers virtually standardized on Nickel cast iron because it provides consistently strong, fine-grained castings, free from porosity and brittleness, and readily machinable in the shop.

York's experience is typical of hundreds of other foundries now using Nickel cast iron to secure these basic advantages:

IN THE FOUNDRY –
By minimizing rejects, Nickel raises man-hour output and correspondingly cuts down the time, labor and money lost by replacing such rejections.

IN THE MACHINE SHOP –
Nickel cast iron also cuts rejects here, because the improved structure and uniformity of the metal provides sound castings that can be easily machined to a smooth finish.

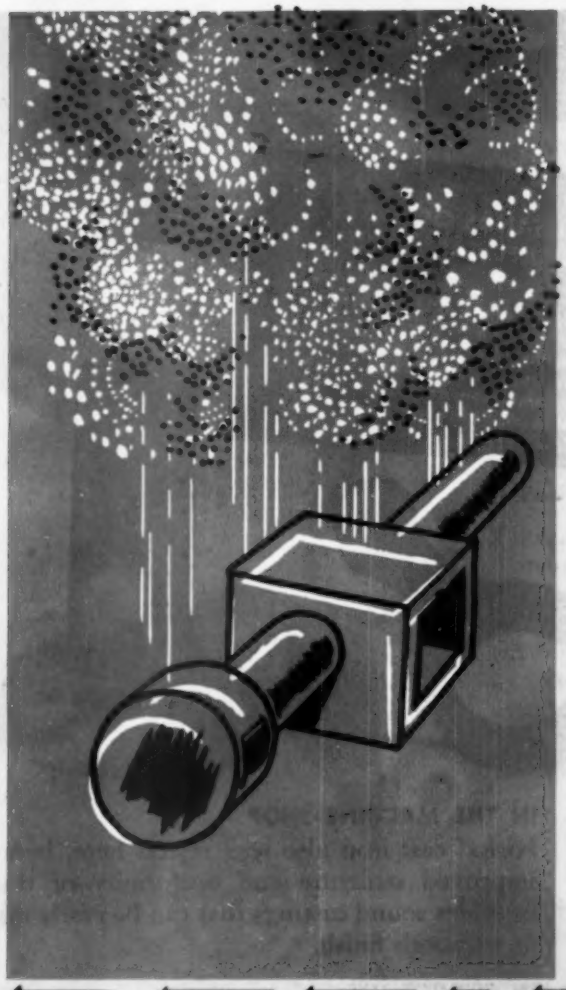
IN SERVICE LIFE –
Nickel cast iron parts provide exceptional wear-resistance that assures long, trouble-free performance for the ultimate consumer.

EMBLEM OF INCO SERVICE
TRADE MARK

Over the years, International Nickel has accumulated a fund of useful information on the selection, fabrication, treatment and performance of engineering alloy steels, stainless steels, cast irons, brasses, bronzes and other alloys containing Nickel. This information and data are yours for the asking. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

The Answer is Found In the SHAKEOUT . . .



All the things that go into the preparation of a casting—skill, experience, judgement, equipment, materials—are locked in the sand after the metal is poured. The sand, then, carries the greatest burden of responsibility. FEDERAL GREEN BOND imparts any desired strength to the sand, thus eliminating guesswork and insuring results. Foundrymen all over the country place their trust in GREEN BOND day after day, because the pay-off is revealed in the shakeout—cleaner castings, fewer rejects and consistently better work.

GREEN BOND

BEST OF THE BENTONITES

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland 5, Ohio

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CANADA—Overseas Commodities Ltd., 2845 Grandview Hgy., Vancouver, B. C. • T. D. Barnes, 59 Sun Life Bldg., Hamilton, Ont. • Newman Foundry Supply, Ltd., 643 St. Paul St. W., Montreal, Que.

European Concessionaires: The District Chemical Company, Ltd., 1-19 New Oxford St., London W. C. 1, England

MAY, 1950

THE FOUNDRY

VOLUME 78—NUMBER 5

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LINOIL at The Driver-Harri

HELPS TO MAKE

If you're a malleable foundry, doing heat treating—or if you do any carburizing, cyaniding, or acid dipping—chances are you're using some of the heat resistant castings made by Driver-Harris.

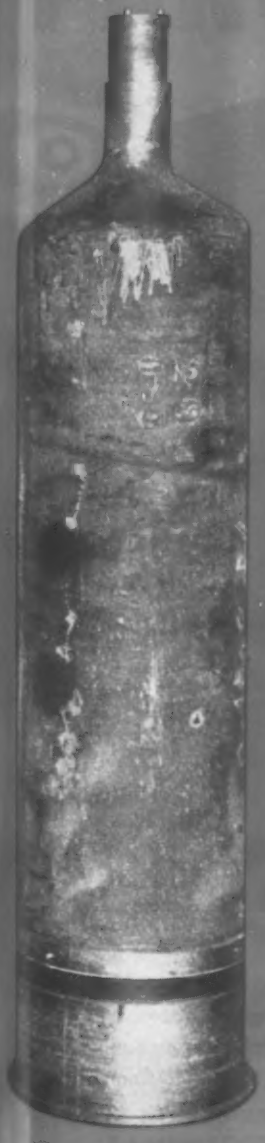
These various products—pots, retorts, shafts, rollers, muffles—are cast from special iron-nickel-chromium alloys that bear the trade names "Nichrome", "Chromax", and "Cimet". They are used in equipment that operates at high temperatures. "Nichrome", for example, analyzes at 60% nickel and 15% chromium: It is the accepted alloy for mechanical uses at 2000°F. to 2100°F.

LINOIL is used in the Driver-Harris foundry for both cores and dry-sand facings. Cores vary in size from small sections up to the large retort cores. On all sizes, however, accuracy of casting dimensions is an important factor, particularly where wall sections are as thin as 1/4 to 5/16 inches.

But possibly LINOIL'S greatest contribution is its dependable performance, especially important where the cost per pound of casting is high. This dependability is one reason why thousands of foundrymen regularly specify LINOIL for their work.

rri ompany, Harrison, New Jersey

K HEAT RESISTANT CASTINGS



Inspecting the LINOIL cores for a horizontal rotary retort. The inset shows a finished casting.

Checking the finish of the LINOIL-bonded dry sand facing on the mold of a horizontal retort. Metal will be poured at about 2800° F.

THE LINOIL THE LOGICAL OIL

WERNER G. SMITH COMPANY

(DIVISION OF ARCHER-DANIELS-MIDLAND COMPANY)

2191 WEST 110th STREET • CLEVELAND 2, OHIO

Famous Pangborn ROTOBLAST Tables *(as shown here) are designed for low-cost, high-quality cleaning of flat and fragile forgings, many kinds of malleable and non-ferrous castings, heat treated parts, etc. For work like this you'll find ROTOBLAST Tables ideal!*

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

Pangborn

* Trademark of Pangborn Corporation

SAVE SAVE

on BLAST CLEANING with PANGBORN ROTOBLAST*

ROTOBLAST makes cash savings possible these five different ways:

SAVES LABOR: *One ROTOBLAST machine and operator can do as much as a two-man crew and old-fashioned equipment.*

SAVES SPACE: *In many cases, one ROTOBLAST machine replaces five or more old-fashioned machines, requires less space.*

SAVES TIME: *Cases on record prove ROTOBLAST can cut cleaning time up to 95.8% compared to older methods.*

SAVES POWER: *Modern ROTOBLAST uses but 15-20 h.p. compared to old-fashioned equipment requiring 120 h.p. for same job.*

SAVES TOOLS: *On work cleaned with ROTOBLAST, cutting tools last up to 3 times longer because no scale is left to dull edges.*

SAVINGS mean PROFITS

See Pangborn ROTOBLAST in action in Cleveland at the Annual Foundry Show Booths 1003-1005 May 8-12.

BY THE WEEK: One foundry, with ROTOBLAST, slashes *$211.56* every week off their blast cleaning bill. An additional saving in this case is *lower breakage losses*—important in any foundry producing intricate and fragile castings.

BY THE MONTH: One more foundry credits ROTOBLAST with saving $423.30 *each month* on blast cleaning. To prove that blast cleaning goes faster with ROTOBLAST, castings are now cleaned in 1/3 the time it used to take!

BY THE YEAR: $10,160 saved on labor alone each year—that's the story from a large ROTOBLAST-equipped foundry. But there are still more savings: five old-fashioned machines with bothersome dust have been completely eliminated—important for a foundry where space is at a premium!

Find out how much you can save! If you're hampered by old-fashioned blast cleaning methods, you can *save money* with ROTOBLAST. There's a modern, economical, efficient ROTOBLAST *Barrel, Room, Table* or *Table-Room* especially designed to solve every blast cleaning problem. Let Pangborn engineers show what ROTOBLAST can do for you. Write today for Bulletin 214 to PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Maryland.

Look to Pangborn for the Latest Developments in Blast Cleaning and Dust Control Equipment

MORE THAN 25,000 PANGBORN MACHINES SERVING INDUSTRY

BLAST CLEANS CHEAPER

with the right equipment for every job

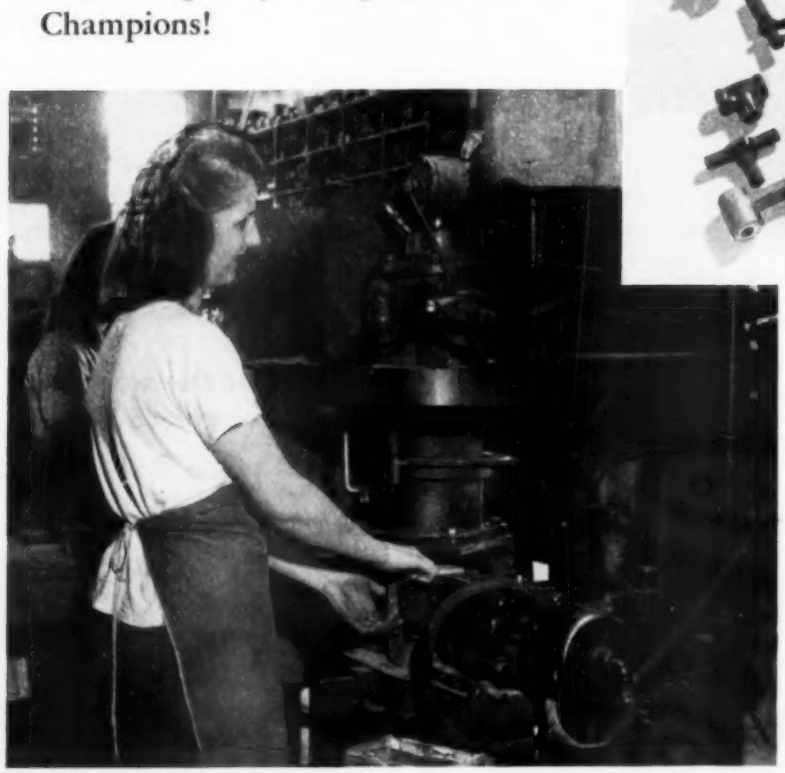
MAKE 'EM BETTER—QUICKER—CHEAPER!

SEE Champion on Display at Cleveland!

In Booth 1617, representative models of the full Champion line, with all latest features, will demonstrate their greater efficiency, economy and speed of operation, to Convention visitors.

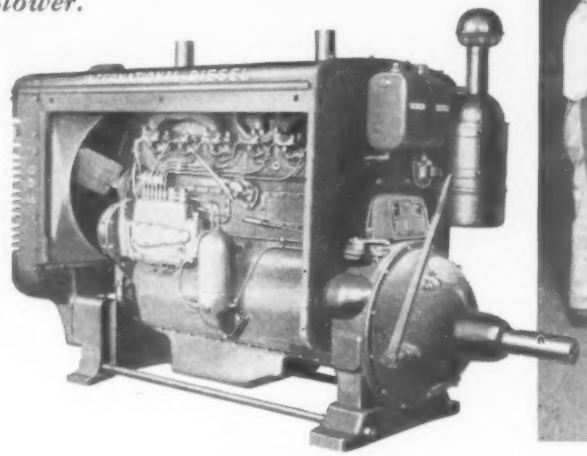
"Big or small...

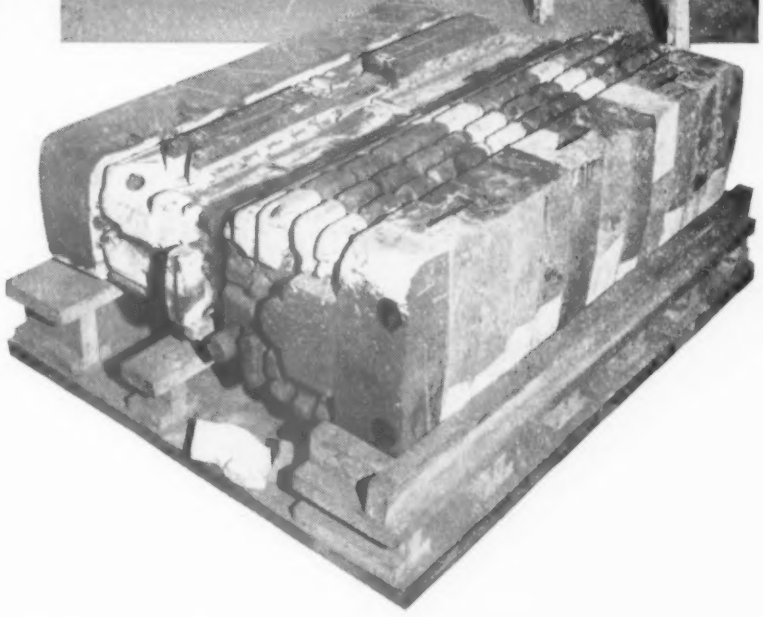
you can blow 'em all—on Champions" —is no idle boast. Leading foundries such as represented in this advertisement are daily proving that you can blow 'em faster, at less cost, with more uniform quality and precision with Champions!



Operating a Champion CB-10 core blower is an easy, pleasant and safe occupation for this girl. Cores are used in brass castings for high grade plumbing fixtures. Photos courtesy Federal-Huber Company.

The largest Champion core blower, a CB-400, at work in the Milwaukee foundry of International Harvester Company producing cores for Diesel engine castings. The actual work of operating the control valves on this machine is no greater than that required on the smallest Champion Core Blower.





From the newest, smallest model,

the "Junior" Champion, up to the Mammoth CB-400, every Champion Core Blower possesses the same distinctive features, the same unique blow valve, which assure a perfect core every time, in a fraction of a second, with the standard air pressure of 85 pounds. Operation is safe, simple, speedy! There's a size and type for every job.

Talk with us about your core requirements . . . you'll find it pays!

Champion engineers and production specialists will be on hand at the Cleveland show to give you the benefit of their long experience in helping you solve any mold or core making problems. Champion molding machines, jolt squeezers, rollover and draw machines have high productive capacity, precision and ease of operation that make the big difference in profitable production. There's a place in any up-to-date foundry for Champion equipment. Let us show you what these efficient machines can do for you.

CHAMPION FOUNDRY AND MACHINE COMPANY

SALES OFFICE: 1553 W. MADISON ST. CHICAGO 7, ILLINOIS

GENERAL OFFICE AND PLANT: ROCKFORD, ILLINOIS

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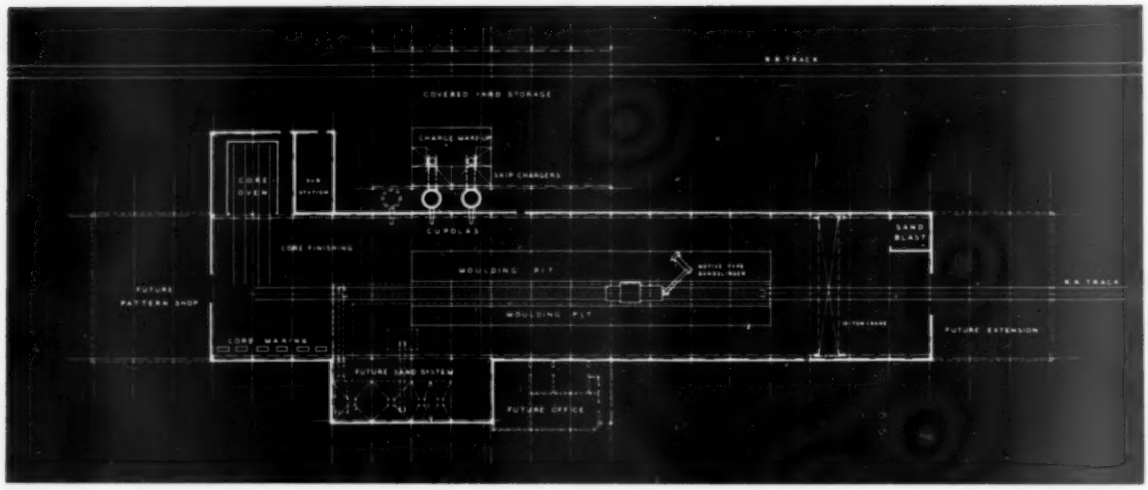
Casilla 153 D, Santiago, Chile



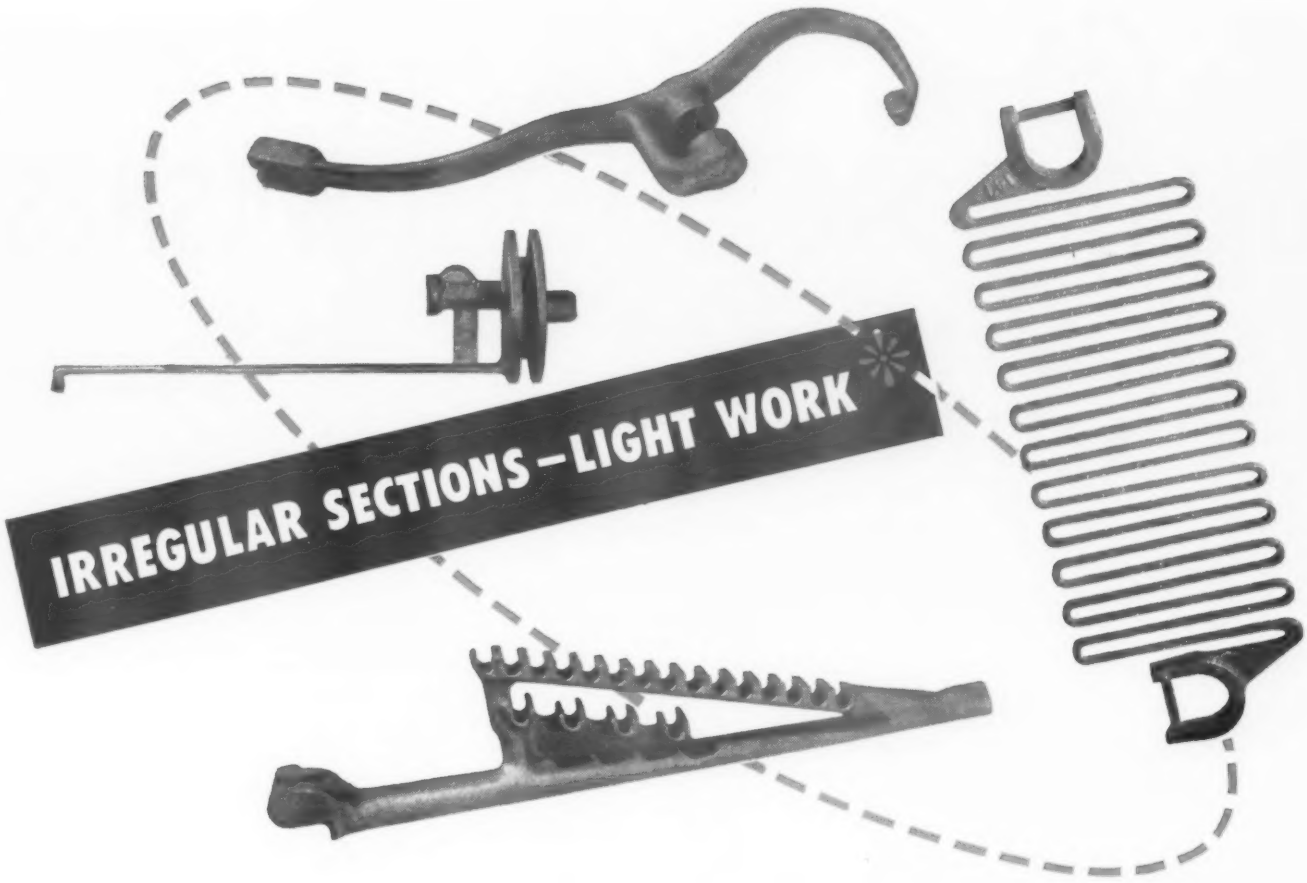
Martin Foundries Co., Detroit, Michigan

This Gray Iron Foundry, recently completed and now in operation, was engineered, utilizing the Owner's operating know-how and the foundry engineering experience of Giffels & Vallet, Inc., to provide efficient production facilities for present requirements and for convenient future expansion.

The foundry engineering experience of Giffels & Vallet, Inc. is available to obtain desired objectives in your plant. We will gladly, without obligation, discuss your foundry problems and the assistance we could render.

GIFFELS & VALLET, INC.

INDUSTRIAL ENGINEERING DIVISION
1000 MARQUETTE BUILDING, DETROIT



*prove the *Extra Value* of

CHATEAUGAY PIG IRON

● Tough casting problems, these . . . highly irregular in section. They require iron with exceptional fluidity for the light work and which at the same time will resist shrinkage in adjacent heavier sections. They must possess strength and machinability.

Quite naturally, this foundry uses Chateaugay Pig Iron. Its high carbon-low phosphorus contents perfectly provide all of these qualities.

Possibly you, too, may have one or more "problem" castings. Why not invite a Republic Pig Iron metallurgist in to help you with them, and to demonstrate the many extra values of Chateaugay in your own shop? Just let us know when you'd like him to call.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic **PIG IRON**

"CHATEAUGAY" Low-Phosphorus, Copper-Free

"REPUBLIC" (Northern) Foundry, Basic and Malleable

"PIONEER" (Southern) Foundry and Basic

REPUBLIC STEEL

New . . . . Improved

DELTA CORE & MOLD WASHES

SPEED PRODUCTION OF BETTER, CLEANER CASTINGS AT *Lower Cost*

Three easy-to-understand reasons why more foundries use DELTA Core and Mold Washes . . .

1. **MORE PERFECT CASTINGS . . .**
2. **LOWER CLEANING ROOM COSTS . . .**
3. **LESS SCRAP IN MACHINING.**

DELTA CORE AND MOLD WASH-BASE
Mix with silica flour and water to produce finished wash.

•

FOR STEEL
STEELKOAT — Special Core and Mold Wash.

•

FOR GRAY IRON AND MALLEABLE
Grakoat — Blackoat — Hi-temp.

•

FOR GRAY IRON
Blackoat S-5 — A new and different wash.

•

FOR NON-FERROUS METALS
Non-FerrusKoat.

•

FOR ALL SAND CAST METALS
THERMOKOAT — It's Plasti-Lastic.
PYROKOAT-HI-Speed.

•

FOR UNUSUALLY HIGH TEMPERATURE CONDITIONS
Z-KOAT — High-fusion-temp. Wash.

•

There is no "just as good" substitute for any DELTA Core and Mold Wash just as there is no substitute for DELTA'S scientific laboratory control of production which safeguards the quality and uniformity of all DELTA Foundry Products. DELTA Research laboratories developed, and pioneered the use of, Plastic-type Core and Mold Washes . . . and still leads the field in the development of new products for improved foundry practices.

NEW mechanical processing and improved chemical formulation . . . developed by DELTA Research . . . have resulted in many decided advancements in both the quality and characteristics of DELTA CORE and MOLD WASHES.

Maximum uniformity of surface coverage is obtained with lower Beaume mixes, using more water. Penetration characteristics are THREE times greater (from 10 to 12 grains deep) and the density of the wash on the surface has been increased 40%.

Due to increased surface density the rate heat conductivity is speeded up and metal in contact with the washed surfaces cools more rapidly, resulting in smoother casting finish.

HERE'S WHY

a. Delta Core and Mold Washes "Anchor" themselves by penetrating from 10 to 12 grains deep into the sand. This bond between the wash and the sand . . . a distinctive DELTA characteristic . . . produces an expansion-resisting coating essential to the production of finer finished castings.

b. The hot strength of Delta Core and Mold Washes increases with each degree of temperature rise from 1800°F to 3000°F providing maximum critical hot strength for all foundry applications.

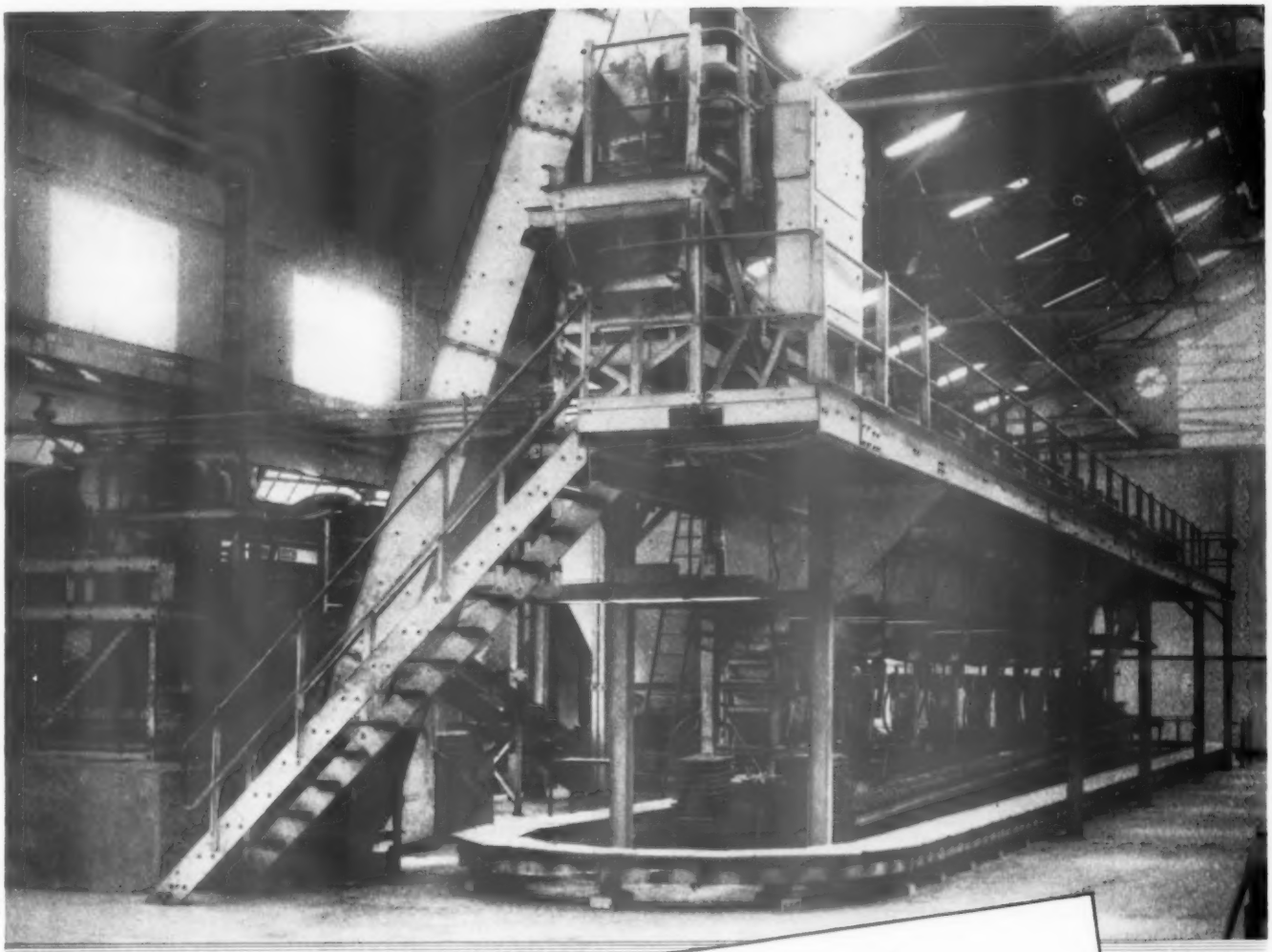
The higher hot strength of DELTA Core and Mold Washes eliminates surface sand fissuring, excessive sand expansion and distortion.

c. No gas leakage through Delta Core and Mold washed surfaces. Gases produced by decomposition of organic binders in the core sand cannot leak through Delta Core and Mold washed surfaces to contact the molten metal. Only Delta Core and Mold Washes provide this unique and all-important insurance against defective castings resulting from core gas leakage. DELTA Core and Mold Washes insure more perfect castings with finer finished surfaces.

● *Ask for a liberal working sample. You will also receive complete data on how to use DELTA Core and Mold Washes in your foundry.*

DELTA OIL PRODUCTS CO.

MILWAUKEE 9, WISCONSIN



The most highly mechanised White Heart Malleable Iron Foundry in EUROPE!

Over one hundred machines working in seven completely mechanised units.

DESIGNED, MANUFACTURED and INSTALLED by STONE-WALLWORK LTD—The Foundry Engineers

The success of Stone-Wallwork equipment, and the excellent results being obtained from it in the many foundries where it is installed, demonstrates that we have the ability to understand the problems and needs of the Foundry Industry, and the necessary high engineering skill to serve it. May we assist you to solve your problems.

MADE IN ENGLAND

STONE-WALLWORK

Foundry Equipment

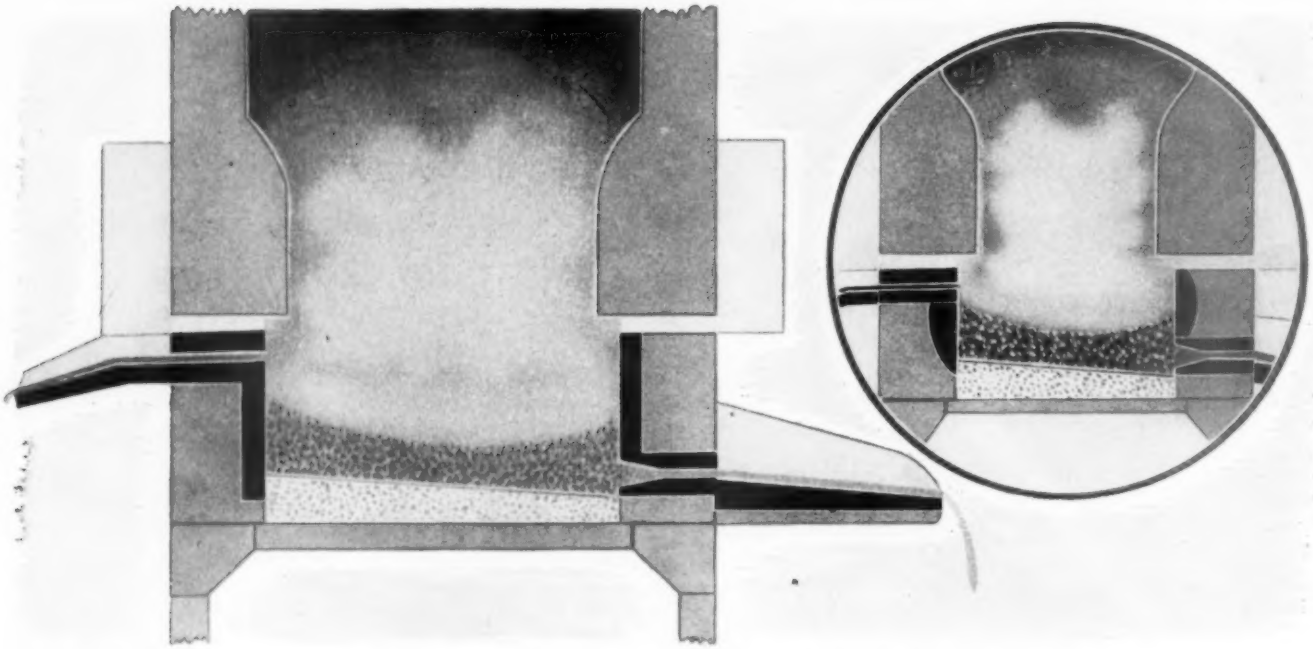
STONE-WALLWORK LTD., 157, VICTORIA STREET, LONDON, ENGLAND.

MEX-R-CO

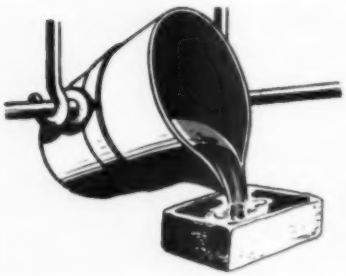
HELSPOT in the Cupola-well

AS ORIGINAL LINING

FOR REPAIRING



HELSPOT FOR LADLE LININGS



A HELSPOT lined ladle successfully resists the corrosive attack of molten metal and slag; the pour is not contaminated by inclusions. More perfect castings — less rejections result when ladles are lined with HELSPOT.

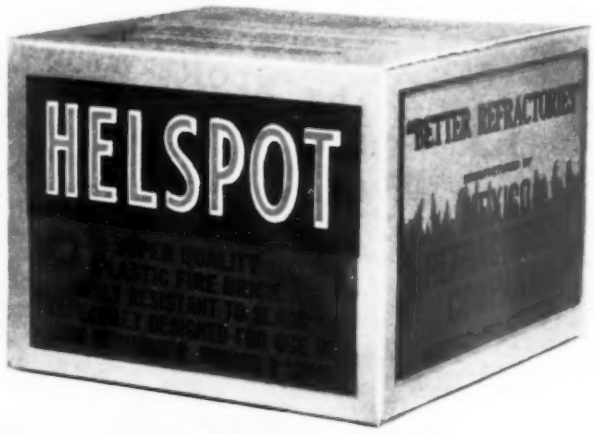
HELSPOT FOR SPOUTS and RUNNERS

In addition to its principal use as a ladle lining, HELSPOT is ideal for lining cupola spouts and runners. The "lubricating" characteristics of HELSPOT promote free flowing of the metal and minimize the formation of slag which may cause bridging.

HELSPOT has proven a boon for lining the cupola-well below the tuyeres. In many installations HELSPOT is credited with giving many times the life obtained from brick and clay combinations. Maintenance problems are reduced; doors drop more freely; a marked saving in labor is noted. Then, too, cleaner and more perfect castings result in greater production and more economical operation.

Install the lining 2-in. thick over new brick work in the well proper, as illustrated above.

For repairing the cupola-well lining HELSPOT may be easily installed over the spalled and eroded brick surface; simply ram HELSPOT in the "dished-out" area.



MEXICO REFRACTORIES COMPANY

"Better Refractories"

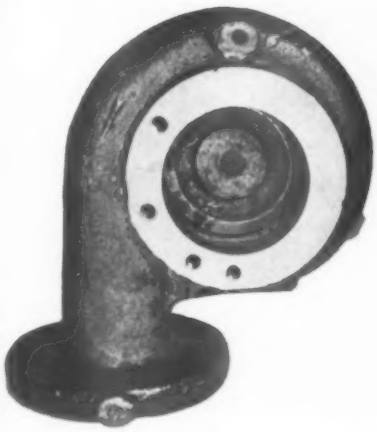
MEXICO, MISSOURI, U. S. A.

Affiliate: National Refractories Company, Lewis Tower Building, Philadelphia, Pennsylvania.

YOU ARE CORDIALLY INVITED TO VISIT US AT BOOTH 420 AT THE FOUNDRY SHOW

Rewarding work!

NI-ROD saves iron castings . . . makes *machinable* welds



But for Ni-Rod electrodes, this pump body would have been scrapped at the foundry. The built-up area of the flange facing is almost indistinguishable from the original cast iron. Machining, drilling and tapping of the Ni-Rod weld deposit were no more difficult than similar operations in cast iron.

In the photograph above, you see a 45-pound gray iron pump casing that was rejected because a small area of the flange failed to fill during pouring.

Instead of being scrapped, the casting was sent to the plant's welding department. There, with Ni-Rod® electrodes, the defective flange was built up and the repaired casting was passed to the machine shop where it was finished like a regular production piece.

Salvage operations like this with Ni-Rod save time and money.

Ni-Rod gives fast, crack-free, non-porous welds that are a close color match for gray iron . . . and welds that are as *machinable* as the iron itself. Slag removal is easy. And Ni-Rod is stable-arcing in all positions with either AC or DC current.

Another important Ni-Rod feature . . . preheating or post-heating is seldom necessary.

Why not try Ni-Rod in your own shop . . . soon? Discover for yourself why *4 out of 5 shops* re-order Ni-Rod, once they've tried it.

Your nearest INCO distributor stocks Ni-Rod in 3/32", 1/8", 5/32", and 3/16" diameters.

FREE – 8-page booklet:
"NI-ROD . . . a new electrode for any cast iron welding."

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

For welds you've never been able to make before . . . in high-phosphorus irons; heavy sections—

NI-ROD "55"

EMBLEM OF SERVICE
INCO NI-ROD
TRADE MARK

NI-ROD DISTRIBUTORS

Alloy Metal Sales, Ltd.	J. M. Tull Metal & Supply Company	Whitehead Metal Products Company, Inc.
Robert W. Bartram, Ltd.	Pacific Metals Company, Ltd.	Wilkinson Company, Ltd.
Eagle Metals Company	Steel Sales Corporation	Williams and Company
Metal Goods Corporation		
Metal & Thermit Corporation	**National Cylinder Gas Company**	**Hollup Corporation**

ANNOUNCING

The ALL-NEW GROOVE STEM

Crowning Achievement of 56 years of Chaplet Design

FEATHEREDGE FUSION RINGS

Knife-like multiple Rings heat instantaneously to fusion temperatures—burning in and eliminating leakers.

COMPLETE CONTACT RADIUS GROOVES

Molten metal lays up solidly against the rounded bases of the radius grooves. Greater chaplet area contact results in maximum fusion. No sharp threads to trap gases or weaken stem strength.

COUNTERSUNK SHOULDERS

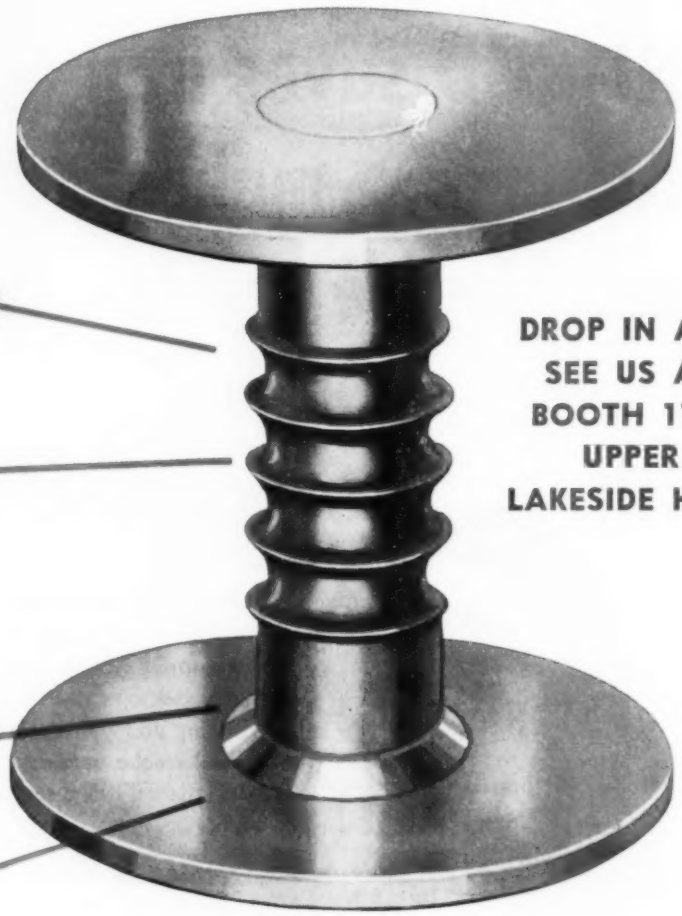
Heavy tapered shoulders provide solid support to plates—allow full contact with molten metal. No sharp angles to create voids usually formed under heads of ordinary chaplets.

PURE TIN COATING*

Not only the surest known protection against rust, but actually an aid to fusion. Tin readily alloys with iron or steel lowering melting point, thus improving fusion.

PRECISION TOLERANCES

Held to plus or minus .002 on most sizes, Fanner reputation for accuracy is unequalled.



Patent Pending

DROP IN AND SEE US AT BOOTH 1105 UPPER LAKESIDE HALL

There is Something New in Chaplets

1. Assured Core Support

2. Maximum Fusion

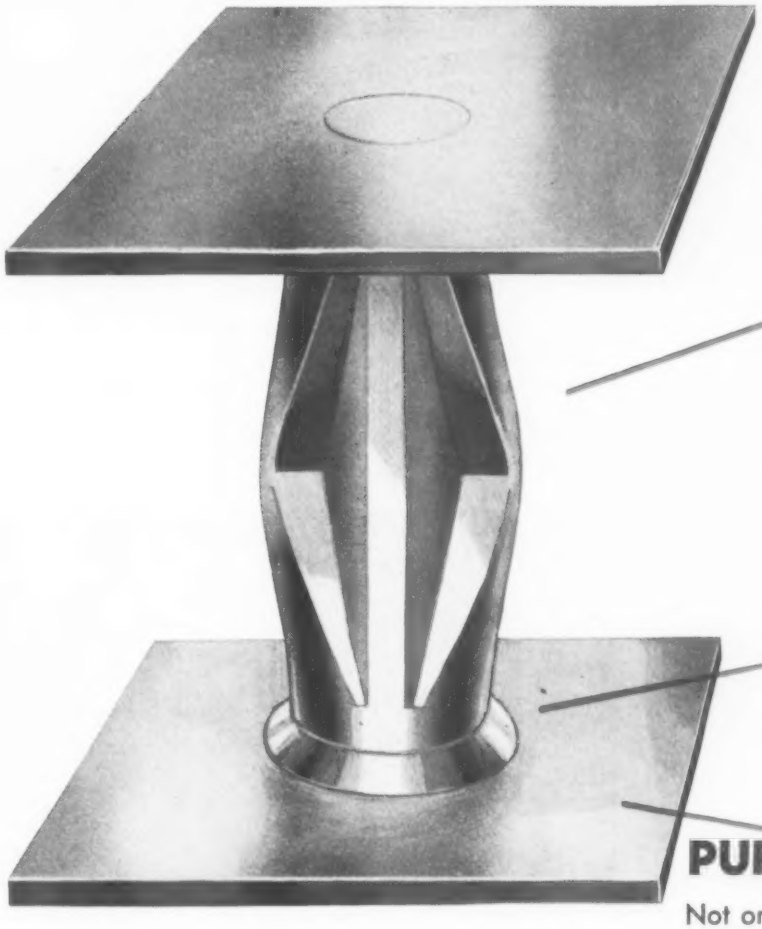
For 56 years Fanner Chaplets have been the standard of ... to produce an even better chaplet, The Fanner Manufacturing Institute, Columbus, Ohio, to conduct exhaustive tests supplemented by field tests in leading foundries, ... Fanner Groovestem chaplet and has redesigned the Famous ... port and completeness of fusion.

The FANNER MFG. CO. *Fanner Chaplets . . .*

ANNOUNCING

...nd The Improved SUPERSTEM

Famous for Years as Sturdiest of All Chaplets



BROAD ANGLE SUPER STEM

To provide greater fusion area, to create a stronger stem and to promote better knitting.

New COUNTERSUNK SHOULDERS

To permit molten metal to lay up in direct contact with all of the shoulder, eliminating voids.

PURE TIN COATING*

Not only the surest protection against rust, but actually an aid to fusion. Tin readily alloys with iron and steel lowering melting point, thus improving fusion.

PRECISION TOLERANCES

Held to plus or minus .002 on most sizes, Fanner reputation for accuracy is unequalled.

* —*Also available in Pure Copper.*

...in Chaplets that Brings Your Foundry

3. Freedom From Leakers

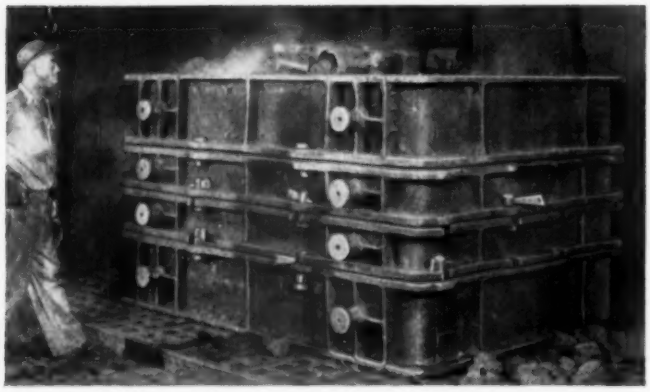
4. Accurate Wall Thicknesses

...he standard of excellence in the foundry industry. In an effort ...nner Manufacturing Company commissioned the Battelle Memo- ... *exhaustive studies of chaplet design.* Based on these studies, ...ndries, ...nner Manufacturing Company has developed the new ...he Famous Superstem, further insuring the maximum in core sup-

...the Standard of the Foundry Industry **CLEVELAND 1, OHIO**

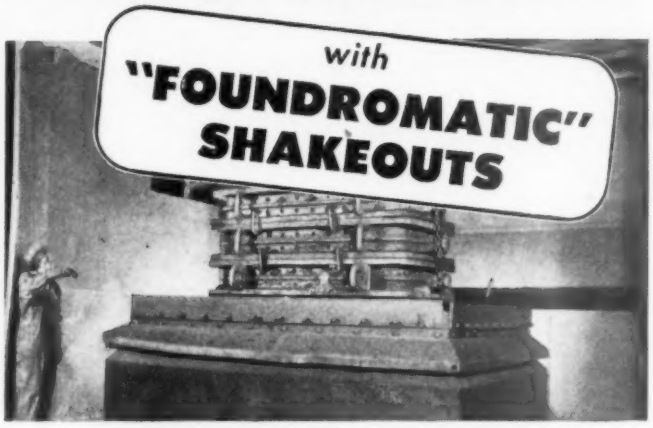
LEADING FOUNDRIES GET

Bonus Production



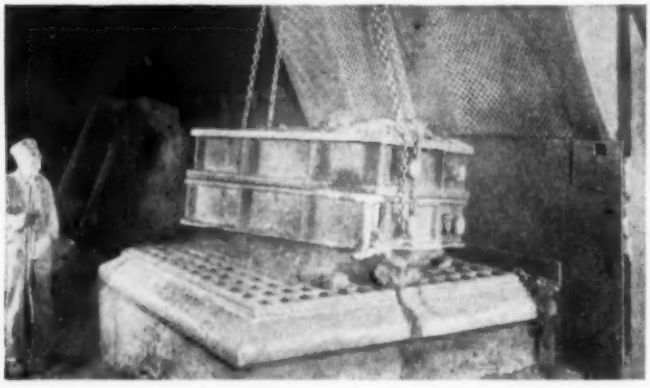
Two 8′ x 10′ Units in Parallel at Leading Cincinnati, Ohio, Foundry.

Floor capacity was increased when these two *Foundromatic* shakeouts were installed in parallel in this foundry. In one nine hour shift they average as high as 40 complete molds with mold weights up to 71,000 lbs!



8′ x 10′ Unit at Falk Corporation, Milwaukee, Wisconsin.

After five years of constant use, this shakeout still provides trouble-free service. This Allis-Chalmers shakeout has never been removed from foundation despite constant operation. Extremely low maintenance costs are reported by Falk company officials.



6′ x 8′ Unit at Bucyrus-Erie Co., South Milwaukee, Wis.

Shakeout runs 12 hours a day, six days a week, and averages between 15 and 20 tons of castings each day. This installation completely serves its purpose of speeding castings from the foundry floor to the machine shop.

4′ x 6′ Unit at Taylor-Wharton Iron & Steel Company, High Bridge, N. J.

This 5° slope shakeout receives sand and castings up to 300 lbs. from the discharge end of an apron conveyor. Sand spillage is minimized and casting cleaning performance is excellent.

YOU CAN GET SIMILAR EFFICIENCY with *Foundromatic* Shakeouts. The body is a one piece, welded, stress-relieved structure, essential for long mechanism life and reduced maintenance. Load on the shakeout is not limited by size of bearings or shaft — shaft is shorter and sturdier than in conventional units.

Your requirements can be met by one of the nine single-body shakeouts from 3′ x 5′ with capacity of one ton, to 8′ x 10′ with capacity of 25 tons. Multiple units can be supplied with capacities of 100 tons or larger.

Call your nearby A-C Sales Office for information, or write for new Bulletin 07B6365A.

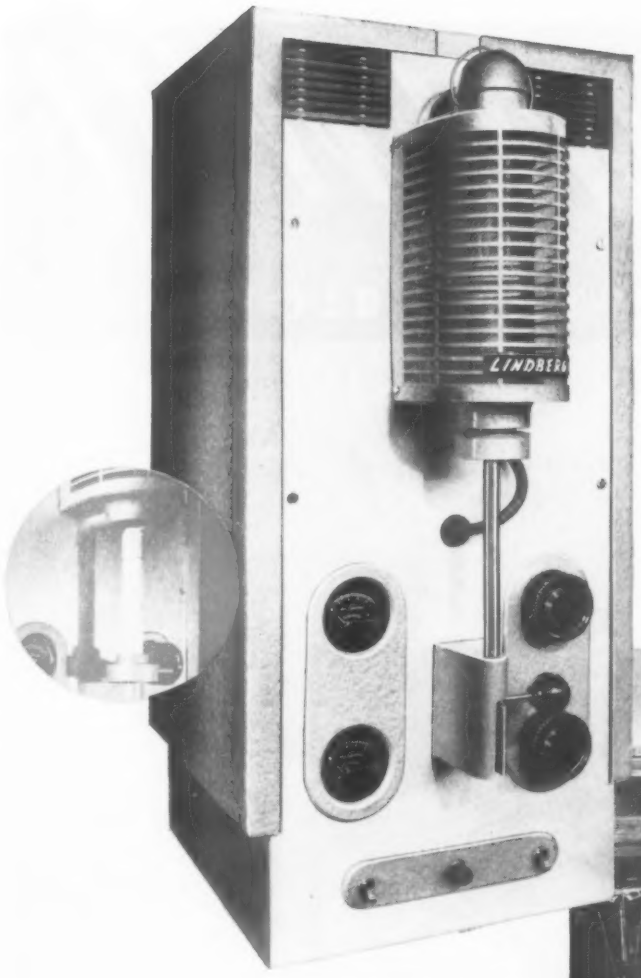
A-3013

ALLIS-CHALMERS, 1032A SO. 70 ST. MILWAUKEE, WIS.

ALLIS-CHALMERS

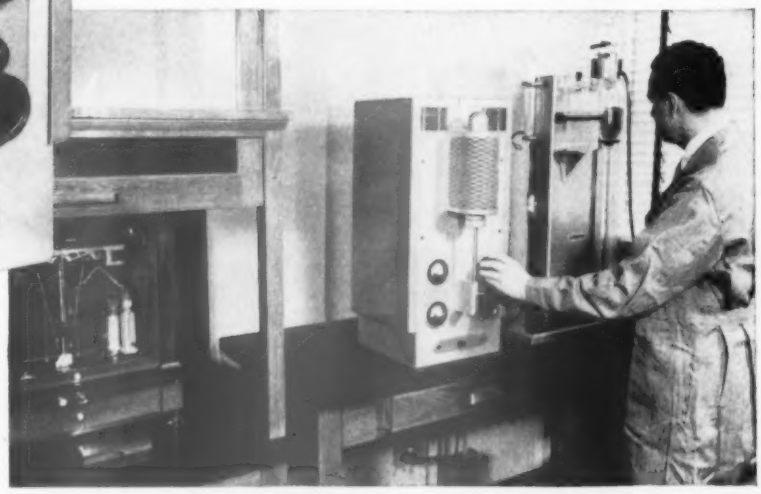
Foundromatic and *Regulex* are Allis-Chalmers trademarks.

Foundry Equipment for Bigger Output-Better Working Conditions!



INSTANT IGNITION

of Solid Samples



Typical laboratory installation. A Lindberg Volumetric Carbon Determinator operating with a Lindberg "H-F" Combustion Unit

The Lindberg "HF" Combustion Unit is revolutionizing carbon and sulphur determinations in laboratories throughout the country. Ready for instant use—instant temperatures above 3000° F.—for steel, cast iron, alloys, or stainless samples—volumetric or gravimetric!

A high frequency unit specially designed for the laboratory

- Ready in the morning in 57 seconds—instantly from then on.
- 90% less power consumption (maximum input 0.125 KW idling).
- Glass combustion tube provides visability of operation.
- Combustion tubes at half the cost, last many times longer.
- Shorter tubes advantageous for volumetric method.
- No elements to burn out or limit temperatures.
- Heats nothing but the sample.
- Eliminates excess heat from the laboratory.
- Inexpensive "cupelet" holds full factor weight for carbons.
- Small and compact—13" wide—28½" high—17" deep.

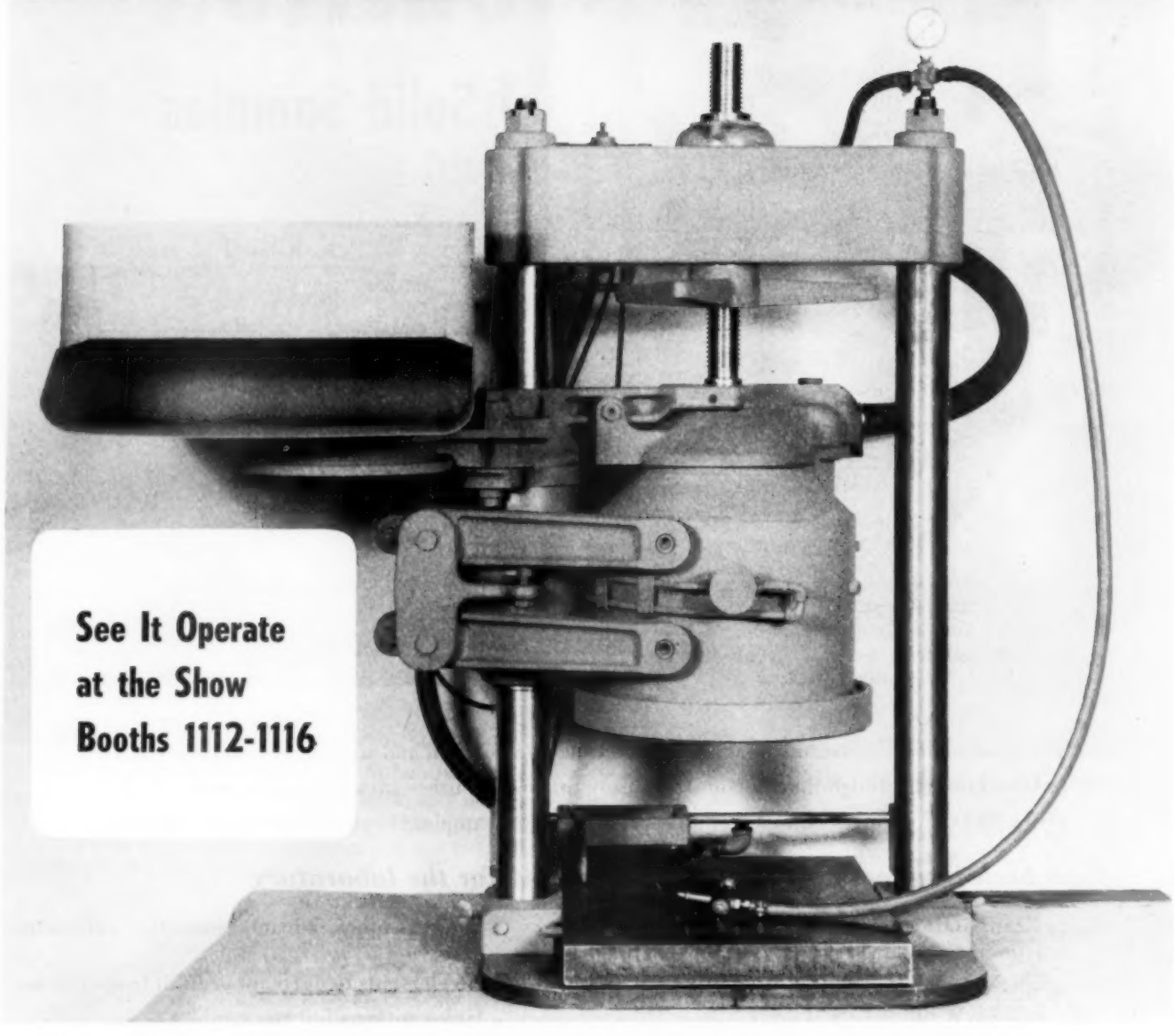
For further details ask for Bulletin 910.

LINDBERG LABORATORY DIVISION

2453 WEST HUBBARD STREET · CHICAGO 12, ILLINOIS

Announcing

SOMETHING NEW IN SAND BLOWING



See It Operate at the Show Booths 1112-1116

Blows any sand that you can hand-ram; dry core compound, green facing or oil sand. Moisture is *not* critical. Ideal for jobbing or production shops. Practically eliminates blow plate changes.

Will blow 213-3 ounce or 1-40 pound core without refilling.

SEE FOR YOURSELF AT THE SHOW!

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street Cleveland 5, Ohio

and Louisville makes ELEVEN

New Louisville, Ky. Tractor Works

is 11th International Harvester foundry

to Install Roto-Clone Dust Control

International Harvester Foundries Served by Roto-Clone

1. Richmond, Ind.
2. Geelong Works, Melbourne, Australia
3. Hamilton, Ont.
4. McCormick Works, Chicago
5. Tractor Works, Chicago
6. Rock Island, Ill.
7. Canton, Ill.
8. Milwaukee, Wis.
9. Memphis, Tenn.
10. Indianapolis, Ind.

11 LOUISVILLE KY.

INTERNATIONAL HARVESTER

International Harvester's drive against dust in foundry operation started 16 years ago with Roto-Clone installations in three foundries. As new foundries were added or old ones modernized Roto-Clone dust control equipment has been selected to spearhead their clean-up campaign. Latest installation is in the new gray iron foundry which supplies castings for International's Louisville Tractor Works. The foundry has a melting capacity of 51.9 tons per hour and operates seven molding lines. On the following pages are illustrations showing where and how Roto-Clones provide high efficiency dust control in all phases of this large scale operation.

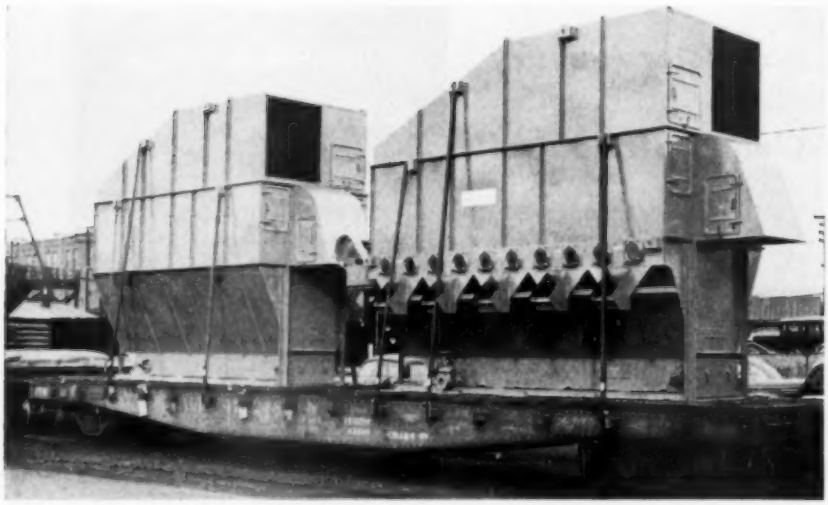
AAF

AMERICAN AIR FILTER COMPANY, INC.

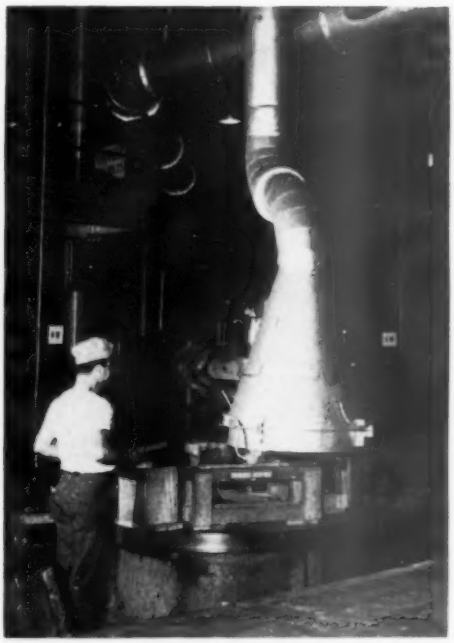
266 Central Avenue • Louisville 8, Kentucky

ROTO-CLONE DUST CONTROL EQUIPMENT

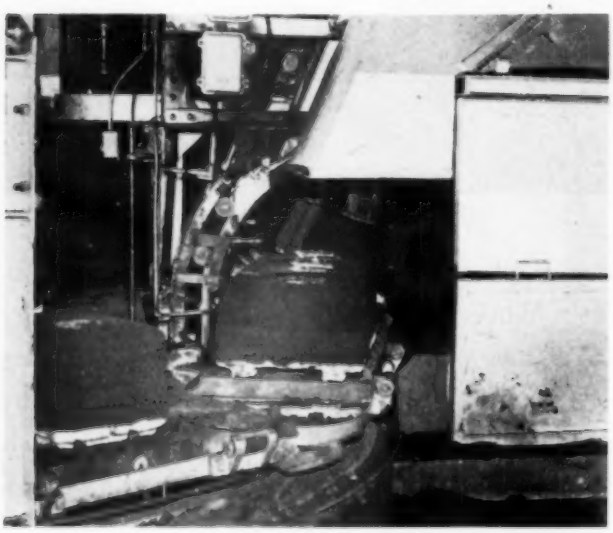
27 ROTO-CLONES serve new Louisville, Ky. Foundry of International Harvester



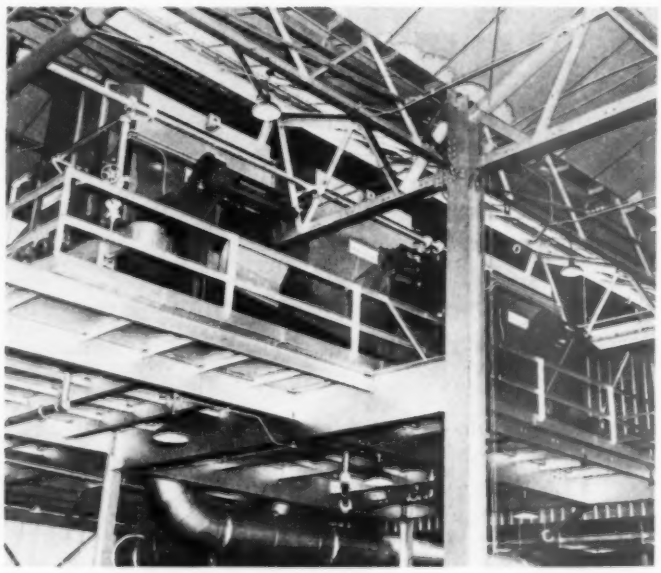
All Aboard. Two of the twenty Type N Roto-Clones ready for shipment. Installation also included seven Type D Roto-Clones. The 27 units exhaust a total of 650,000 cfm of dust laden air.



Core Grinding. One of four core grinders equipped with exhaust hood which is designed to both rotate and elevate to meet changing locations of grinding wheel. Exhaust volume of 4200 cfm prevents dispersion of fine sand.



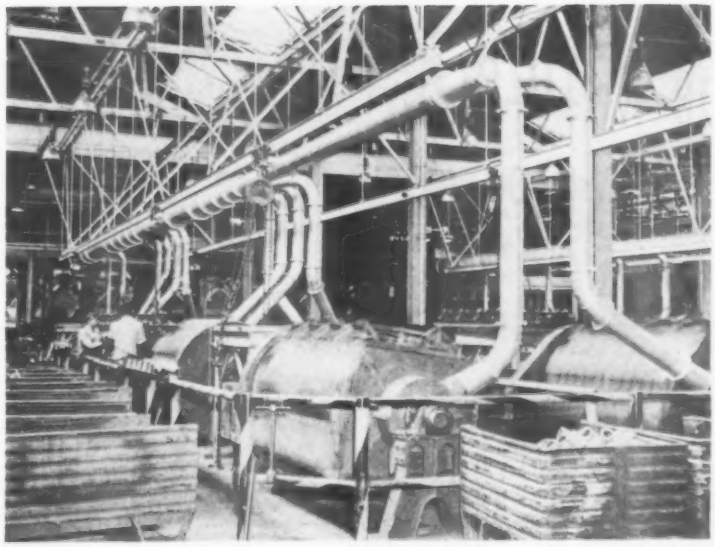
Shake-out. Snap flask units are upset onto 4′ x 10′ vibrating shake-out equipped with hood which is ventilated by an exhaust volume of 9000 cfm.



Space Savers. Compact design of Roto-Clones permits overhead installation of this battery of 3 Type N units to conserve valuable floor space.

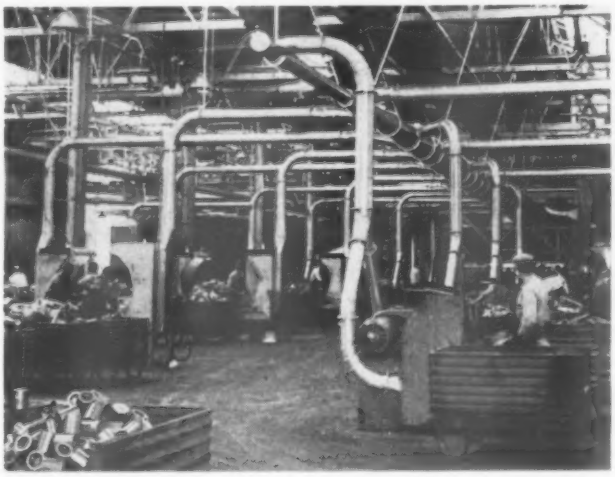
AAF

ROTO-CLONE DUST CONTROL EQUIPMENT

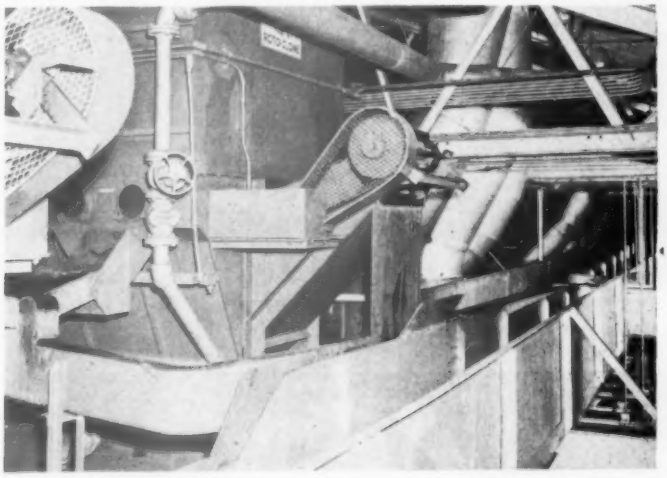


Tumbling Mills. Roto-Clones in the cleaning room provide 147,300 cfm of exhaust ventilation for 21 tumbling mills, 5 abrasive cleaning units, 11 stand grinders and 21 chipping booths.

Chipping Bench. One of 21 chipping benches which are provided with back shields, individual lighting, and a down draft and lateral exhaust of 2200 cfm for each station.



Cleaning Room. Clean castings are finished on chipping tables and stand grinders. Note complete and effective hooding of two wheel pedestal grinders shown in foreground. All units are exhausted by Type N Roto-Clones.



Sluicing Systems for Refuse. Dust collected by Roto-Clones is ejected as a sludge into a gravity flow sluicing system. Sluices supply disposal method for sludge and all dry foundry refuse.

Sludge Settling Tanks. Sludge and other foundry refuse from two sluicing systems are delivered to these four settling tanks. Refuse is removed by overhead crane equipped with grab bucket and carried by truck to the disposal area.

Summary of Roto-Clone Applications in this Modern Foundry

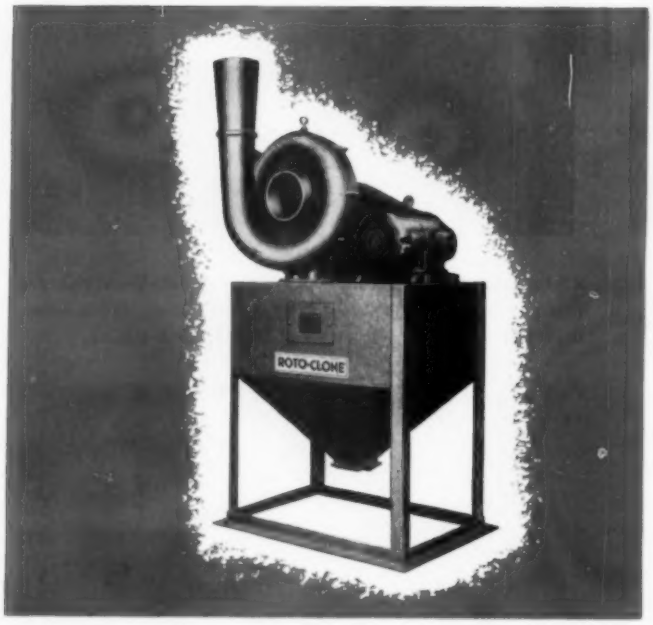
1. Cleaning stack gases from 6 cupolas
2. Shake-outs
3. Sand Conditioning Systems
4. Core Sand System
5. Chipping Tables
6. Stand Grinders
7. Abrasive Cleaners
8. Tumbling Mills

AAF

ROTO·CLONE DUST CONTROL EQUIPMENT

There's a size and type ROTO-CLONE to solve every foundry Dust Problem

FOUNDRY SHOW
BOOTH 1315
Visit With Us
And See These
Roto-Clones In Action



Roto-Clone Type D. The Type D Roto-Clone, with cast iron housing, is designed for the dry collection of granular dusts. Available in ten sizes for capacities from 200 to 15,000 cfm.

Roto-Clone Type N. The Type N Roto-Clone cleans the air by means of a water curtain induced by the flow of the air through the collector. Has no moving parts, pumps or other auxiliary equipment —requires minimum space—easy to install. Available in eleven sizes —capacities from 1,000 to 48,000 cfm.

Roto-Clone Type W. A design which combines the scrubbing effect of water sprays with the principle of Dynamic Precipitation. Available in 11 sizes and three arrangements from 1,000 to 30,000 cfm. Provides complete collection of finely divided materials.

Write for Bulletin No. 270!

Contains complete information on the Roto-Clone principle of dust control—design and application data on each of the three units shown above.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION MEMBER FEMA

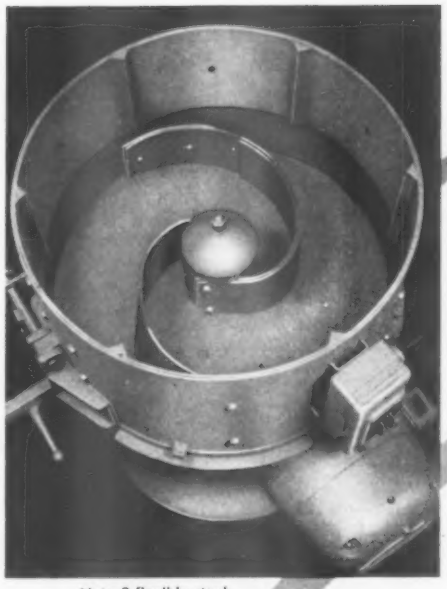
AAF

AMERICAN AIR FILTER COMPANY, INC.

266 Central Avenue • Louisville 8, Kentucky

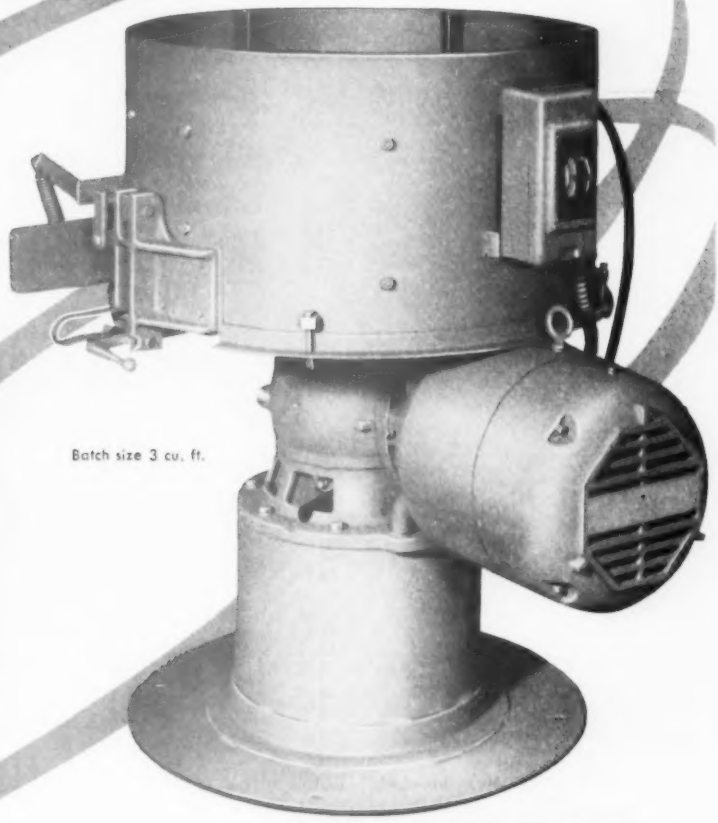
ROTO-CLONE DUST CONTROL EQUIPMENT

WHIRLMIX



Note 2 flexible steel rubbing arms.

Discharge door is 28" off floor, high enough to accomodate a 3 cu. ft. wheelbarrow.



Batch size 3 cu. ft.

NEW BIG SAND MIXER

SMALL IN SIZE- IN PRODUCTION

● The Whirlmix, a big producer, will mix more sand per hour at lowest cost . . . 4,000 lbs. of oil core sand or facing sand *per hour.*

Small—compact, the Whirlmix is an integral unit which does not require a foundation. Weighs only 1,060 lbs. Can be moved easily by crane or lift truck from one location to another.

Two flexible spring steel whirling arms exert the proper pressure to the sand. No crushing of sand grains; no overheating of sand. This produces a uniform mixture of either core oil, dry core compound, or facing sand. The Whirlmix gives you a fluffy sand (does not need aerating), efficiently mixed without crushing.

If you want a mixer which will give you tonnage, an efficient mix, and complete satisfaction, write us today about this new sand mixer . . . Whirlmix (Model No. 300) . . . small in size, a little giant in production . . . only $1,185 f.o.b. Cleveland, Ohio.

SEE YOU AT BOOTHS 1112 AND 1116

THE FEDERAL FOUNDRY SUPPLY COMPANY

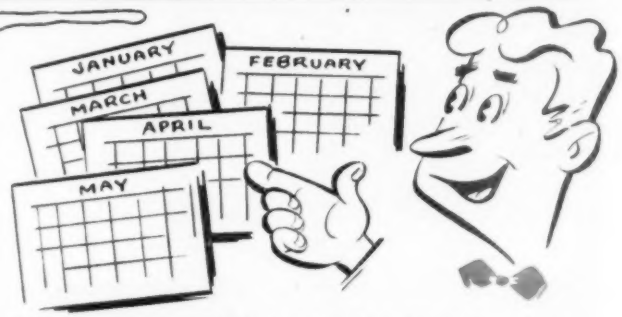
4600 East 71st Street • Cleveland 5, Ohio

CROWN HILL, W. VA. · CHICAGO · MILWAUKEE · RICHMOND, VA. · ST. LOUIS

CHATTANOOGA, TENN. · MINNEAPOLIS · NEW YORK · DETROIT · UPTON, WYO.

Lynchburg Foundry* SAVES 56.7% on BLAST CLEANING with Malleabrasive!

* *Results of Malleabrasive test conducted by Lynchburg Foundry Co. of Lynchburg, Va., as reported by The Globe Steel Abrasive Co.*



To get the facts on Malleabrasive, Lynchburg Foundry set aside 16 weeks for comparative tests to check cleaning costs before and after using Malleabrasive.

The results were amazing! Lynchburg's impartial tests proved 100 lbs. of Malleabrasive does the work of 230 lbs. of ordinary shot or grit . . . an actual saving of 56.7% hourly!

Further checks on cleaning costs showed Malleabrasive saved $7.38 out of every $10.00 Lynchburg formerly spent for replacement parts. But that's not all . . .

After all test results were in, Lynchburg Foundry found the switch to Malleabrasive means an actual cash saving of $2,995.00 a year—all clear profit.

TEST MALLEABRASIVE YOURSELF!

If you want to save money on blast cleaning, take advantage of this offer! We'll send you all data needed to run a comparative test *just like Lynchburg's* right in your own cleaning room! Remember, Malleabrasive is *guaranteed* to outperform ordinary shot and grit when comparative tests are properly run. Malleabrasive is more than "heat treated" or "annealed," Malleabrasive is a radically new abrasive. But find out for yourself. Write for TEST INFORMATION to: THE GLOBE STEEL ABRASIVE CO., Mansfield, Ohio.

†U.S. Patent #2184926
(other patents pending)

Save on blast cleaning with

PATENTED† Malleabrasive®

THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO

· MANUFACTURERS OF METAL ABRASIVES SINCE 1907 ·

COLEMAN OVENS

BAKE CORES AT LOWER COST

— than any other known method! —

● Cores are made only to be destroyed in serving their purpose in the production of good castings. Therefore the method that produces all the perfect cores you need at the lowest possible cost is the best method to use. No other method can produce cores at lower cost than Coleman Ovens because only Coleman Ovens enable you to combine all these advantages for the greatest overall economy:

...the GREATEST FUEL SAVINGS by using the most economical fuel available.

...the GREATEST SAVINGS IN LABOR resulting from the most efficient handling methods for *your* production.

...the USE OF MOST SATISFACTORY BINDERS for your particular casting requirements—oil *or* resin.

...the MOST EFFICIENT USE of your available production floor space.

...the FINEST AND MOST DEPENDABLE BAKING METHOD to eliminate rejects and make-overs.

...the LOWEST MAINTENANCE COST for up-keep and service.

COLEMAN OVENS can assure you of these results because they are proven through over 10,000 Coleman Oven installations. No other method can furnish you with an equal record of efficiency or dependability!

For information on Coleman Ovens to meet your needs, write for Bulletin 48 today.

COLEMAN TRANSRACK OVENS
at Crucible Steel Castings Co.

For use with portable racks to reduce handling labor. Designed to provide maximum flexibility of core sizes and shapes for jobbing shop requirements.

COLEMAN OVENS are built in a complete range of sizes and capacities for every core-baking and mold drying requirement: Tower Ovens, Horizontal Conveyor Ovens, Car-Type Ovens, Transrack Ovens, Rolling Drawer Ovens, Portable Core Ovens, Portable Mold Dryers, etc.

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

THE FOUNDRY EQUIPMENT COMPANY

MEMBER FEMA

1831 COLUMBUS ROAD **CLEVELAND 13, OHIO**

Lynchburg foundry

mexacote

Lynchburg worker spraying green resin core for clutch housing with a 15° Mexacote solution. Green resin core for transmission is waiting to be sprayed. Baked cores may be dipped for Mexacote treatment.

Mexacote-sprayed green resin core for clutch housing is placed in the oven for drying. Some cores are first baked and then given a 40° Baume' coating of Mexacote.

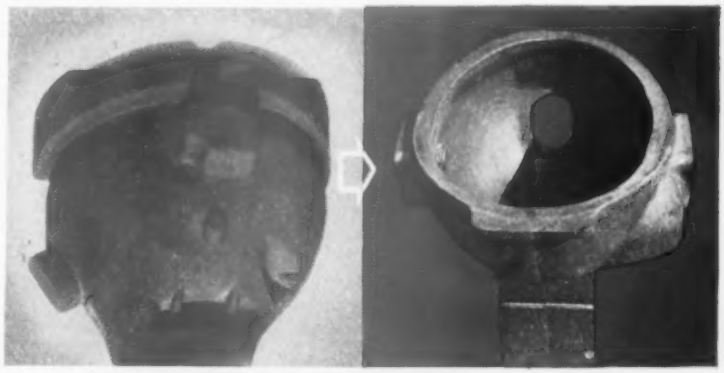
We'll see you at the Foundry Convention in Cleveland. May 8-12
Booth 902 In the Arcade . . . .

THE UNITED STATES GRAPHITE COMPANY

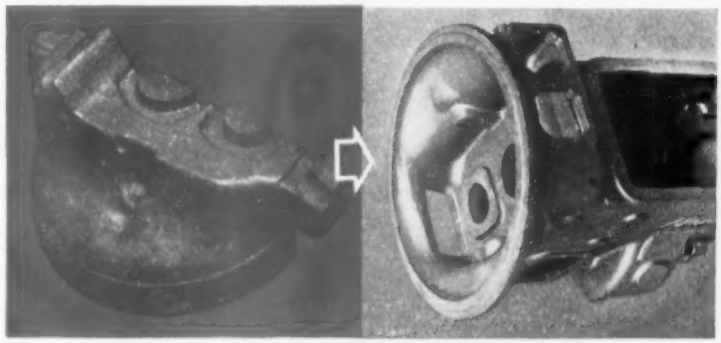
sprays cores with for finer casting finish

To find a product that would produce a high surface hardness on their cores and give a better casting finish, the Lynchburg Foundry Company tested many different products. After exhaustive tests on a wide variety of cores they found that MEXACOTE would do exactly what they wanted it to do. Say Lynchburg engineers: "Now we spray all cores — where spraying is possible—with a 15° Baume' solution of MEXACOTE and the results have been highly satisfactory."

When you want a better casting finish, spray or dip molds and cores with MEXACOTE. It quickly mixes with water and thins to a spraying consistency. MEXACOTE forms a firm coating that will not crack, shrink, scab, peel or buckle under heat, and can be dried by torch, lamp, or oven. A solution of 20° Baume' is usually recommended for spraying, 35° for dipping. MEXACOTE holds true core dimensions, does not run or build up — penetrates sand to prevent burning in. Write for special MEXACOTE bulletin.



From core to casting. The picture at left shows one part of the core assembly for clutch housing after having been sprayed green with Mexacote and baked. At right is the casting. Note fine finish that will require minimum finishing.



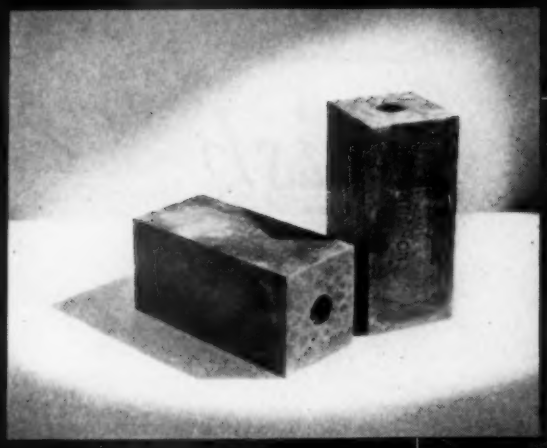
At left, resin cores for part of truck transmission case are sprayed green with Mexacote. At right is the transmission case after casting. Note absence of veining of cored surfaces.

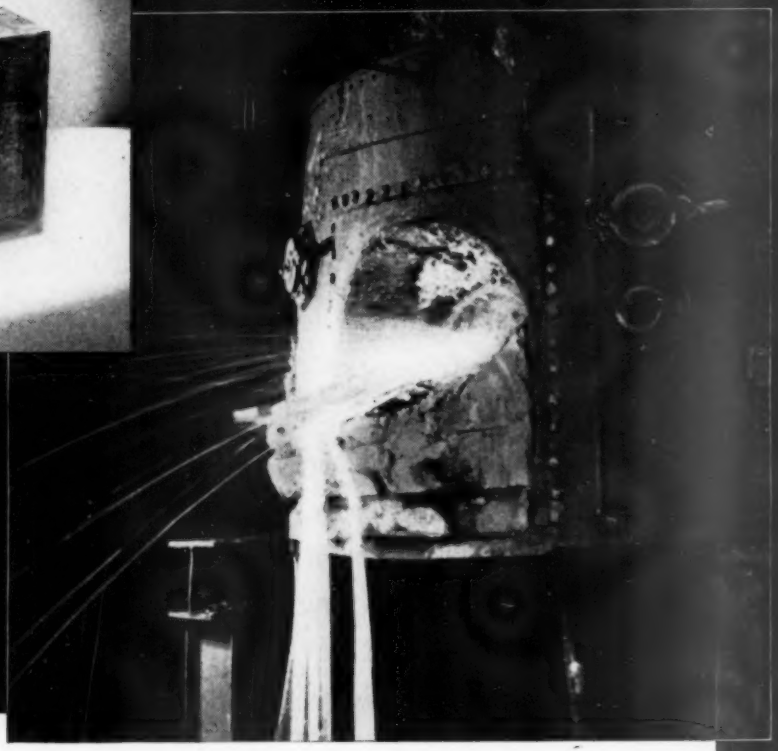
mexacote

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

CRYSTOLON Slag Hole Blocks

Pay Their Way in the Foundry





CRYSTOLON slag hole blocks, made by Norton Company of densely bonded silicon carbide grain, give long trouble-free service in foundry cupolas. The hard, dense surface of these chemically inert blocks is resistant both to the abrasion and penetration of molten slag.

CRYSTOLON blocks resist all slag action either by corrosion or erosion. Consequently the hole size is maintained for a longer period of time, giving better control of the flow. These rugged slag hole blocks are highly refractory and will neither soften nor spall at temperatures up to 1650°C.

NORTON REFRACTORIES LIKE HEAT

NORTON COMPANY • WORCESTER 6, MASS.

5=15

THE NEW ROTOR "MULTI-POWER" CHIPPERS

5 "REGULARS"... 5 "SUPER-SPEEDS"... 5 "SUPER-SOCKS"
—ALL FROM 5 BASIC MODELS

SEE HOW YOU SAVE

with the versatile New Rotor Chippers

USERS of the New Rotor "Multi-Power" Chipping Hammers are enthusiastic about them because they give these top values:

3 MODELS IN 1. By a simple change of parts, you can adapt each of the 5 basic models to serve as 3 hammers to match your job: (1) A "regular" model, (2) A "super-speed" model, (3) A "super-sock" model.

LIGHTER WEIGHT. These new Rotor Chippers average 1½ to 2 lbs. lighter than other chippers making them easier to handle.

SHORTER. Exclusive "doughnut" valve makes possible saving of 1″ to 2″ in length, making it easier to get into these tough, crowded corners.

FASTER CUTTING. You get more blows per minute . . . because of new exclusive design.

Get all the facts. Write for catalogue No. 37.

AIR O'TOOL

Reduce Your Refractory Costs...

There's a Specific

A. P. GREEN REFRACTORY

for Every Foundry Operation

Scientifically engineered refractories contribute tremendously to operations resulting in fewer rejected castings. The A. P. Green refractory products illustrated will help you accomplish this objective.

The A. P. Green Company manufactures a complete line of fire-clay refractories designed for use in the foundry. Operators throughout the industry have come to depend upon these products to meet their particular requirements. In many cases they have reported 25 to 50 per cent greater service over other materials.

The A. P. Green Fire Brick Company Engineering Department will assist you with further information concerning the reduction of refractory costs in your foundry. Call your local A. P. Green Sales Office or Distributor — listed in the yellow pages of your telephone directory — or write address below.

A. P. GREEN PRODUCTS FOR USE IN THE FOUNDRY CHECK THIS LIST—SPECIFY THEM BY NAME

SATANITE A super fire-clay mortar — highly resistant to molten metal and slag — eliminates joint erosion.

GREENCOTE Refractory maintenance coating used as a ladle wash coat and for reconditioning refractory linings.

'SAIRSET Air-setting, high temperature bonding mortar for laying fire-brick — has excellent working properties and forms a strong bond.

KAST-O-LITE A lightweight 2500° F. insulating castable recommended for monolithic linings of annealing ovens and heat treating furnaces.

SUPER-PLASTIC A super duty, plastic for lining ladles, cupola spouts and for patching.

CUPOLA BLOCKS Are uniform in shape and size — highly resistant to slagging and abrasive conditions.

INSULATING FIREBRICK

G-20 for temperatures up to 2000° F.
G-23 for temperatures up to 2300° F.
G-26 for temperatures up to 2600° F.

OUR 40TH YEAR SERVING THE WORLD'S INDUSTRIES

A. P. GREEN FIRE BRICK COMPANY
MEXICO, MISSOURI, U. S. A.
In Canada:
A. P. GREEN FIRE BRICK COMPANY, LTD.
Toronto 15, Ontario
Distributors in the Principal Cities of the World

A. P. Green
REFRACTORY PRODUCTS

SEE it at
the FOUNDRY Show
May 8-12

THE *NEW* SANDMASTER

A Fast Maneuverable, Versatile
Sand conditioning machine

The new SANDMASTER, another significant contribution to the Foundry Industry, will be unveiled at the 1950 Foundry Show by AMERICAN . . . leaders for more than 43 years in developing improved foundry equipment. See the SANDMASTER on display at Booth 1417 Lower Lakeside Hall.

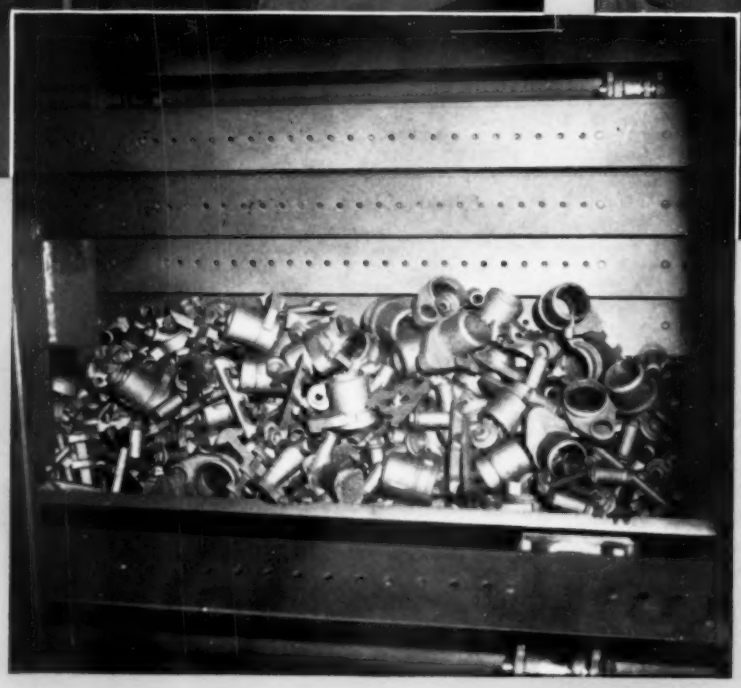
American

WHEELABRATOR & EQUIPMENT CORP.
505 So. Byrkit Street **Mishawaka 2, Indiana**

Please turn page

WHEELABRATOR
continuous tumblast cuts c

cleans a continuous flow of castings . . . AUTOMATICALLY



The Continuous Tumblast is automatically loaded by a conveyor system. No manual loading is required.

Castings are cascaded within the abrasive blast of two Wheelabrator Units to scour every surface brilliantly clean.

Cleaned castings are discharged onto a second conveyor which carries them to the sorting, grinding and finishing department.

WORLD'S LARGEST BUILDERS
OF AIRLESS BLAST EQUIPMENT

American

THE AMERICAN MOLDER

Please turn page

Manufacturer of
Brass Plumbing Fixtures

ts cleaning costs in half

SAVES $2.26 per ton

Because of a limited cleaning volume of only nine tons daily, company executives were skeptical that cleaning costs could be reduced sufficiently to repay their investment in a Wheelabrator Continuous Tumblast. However, a direct cash savings resulted immediately after installation, even with this low tonnage. Now, after one year's time, the Continuous Tumblast has proved that it will pay for itself by saving $5,085.

The Continuous Tumblast replaced a conventional batch type cleaning machine and eliminated all manual handling of parts in the cleaning department. Castings are brought to the loading hoppers by a conveyor. When clean, they are unloaded automatically through a discharge hopper onto another conveyor which carries them to the sorting, grinding, and finishing department. Castings flow through the cleaning operation without interruption. There are no costly, time-consuming interruptions for starting, stopping, loading and unloading as in the conventional type blast mill.

As the castings progress through the cleaning chamber, all surfaces are exposed to the abrasive blast of two Wheelabrator Units. This tremendous abrasive barrage removes every trace of sand and scale, cleaning the castings better than ever before.

In addition to actual dollar-and-cent savings, other advantages are cleaner working conditions and a faster, more even flow of work.

Whether your cleaning volume is large or small, there is a Wheelabrator Machine that can cut your cleaning costs . . . and pay you a profit for years to come. Write today for full information.

COST COMPARISON CHART

	FORMER METHOD	WHEELABRATOR METHOD
MACHINE	Blast cleaning mill	26" Continuous Wheelabrator Tumblast
PRODUCTION	9 tons in 9 hours	9 tons in 5 hours
LABOR REQUIREMENT (Cleaning and Handling)	18 man hours daily	5 man hours daily
COST PER TON:	$4.23	$1.97

SAVINGS: PER TON $2.26 PER DAY $20.34 PER YEAR $5,085.00

WHEELABRATOR & EQUIPMENT CORPORATION

505 South Byrkit Street Mishawaka 2, Indiana

Please turn page

DUSTUBE *SAVES* ON MAINTENANCE COST

- **simple, trouble-free operation saves time and labor**

There are so few working parts to wear that Dustube requires practically no attention at all. One man can service it without any tools. Inspection is an easy job from the clean air side. There are no heavy frames or screens to unbolt in determining the condition of the cloth filter tubes. It takes only a few seconds to insert a new tube when needed.

Dustube has proved its cost-reducing advantages in plants throughout the country. It will do the same for you. Write today for full information.

Mr. Ernest Donley, Maintenance Foreman

"Periodic inspections are simple — all working parts are easily accessible — in a few minutes the job is finished without removal of tubes or the use of any special tools. For dependable, high efficiency, the Dustube can't be equalled — trouble is non-existent. Operating costs are also low — the few cents a day for power we spend assures us the best in dust collection."

SEE HOW IT *SAVES* for THE H. W. CLARK COMPANY, Mattoon, Illinois

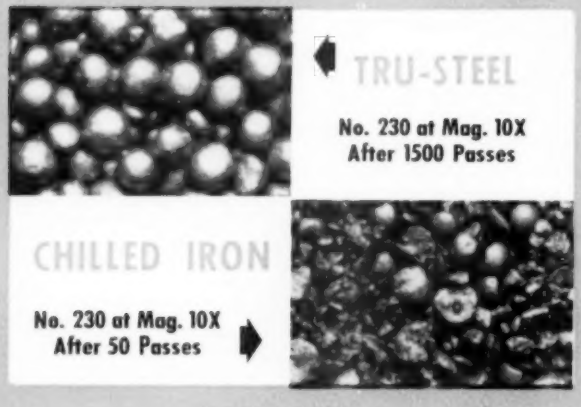
Mr. Francis Thompson, Finishing Foreman

"We depend upon our Dustube Dust Collector for sixteen hours of heavy service daily in ventilating grinders, tumblers and our Wheelabrator Tumblast. Our cleaning room is as clean as any other department in the plant and we recently were commended highly by our insurance inspectors on our dust collector set-up. Our experience with the Dustube has been very gratifying."

American **WHEELABRATOR & EQUIPMENT CORP.**
505 S. Byrkit St., Mishawaka 2, Indiana

TRU-STEEL Shot

Saves 30% in CLEANING COSTS



PROMINENT DETROIT MANUFACTURER
FINDS THAT TRU-STEEL SAVES

72% in Shot Consumption
35% in Abrasive Costs
63% in Replacement Parts

"We find that we had a 72% savings in the amount of abrasive we used and, while the Tru-Steel represented a higher initial cost, we still realized a 35% savings in the cost of the abrasive used because of the longer life of Tru-Steel Shot.

"Another big advantage we find is the longer life of the machine itself. We saved 63% in the cost of replacement parts, not counting the time saved by our maintenance men in not having to replace parts as often. Just figuring the savings in abrasive and parts alone, we showed a savings of 30% in the cost per ton of parts cleaned compared to our previous costs with chilled iron shot."

Make your own test. Order a supply of Tru-Steel Shot today.

American **WHEELABRATOR & EQUIPMENT CORP.**
505 S. Byrkit Street **MISHAWAKA 2, INDIANA**

Please turn page

When Foundrymen Weld...

this is the Eye Protection they Favor

AO WELDERS' GOGGLE

Welders, welders' helpers, supervisors, apprentices, furnacemen and other foundry workers working on or near electric welding operations find the AO3080 goggle ideal for the DOUBLE PROTECTION required against both injurious light or glare and impact hazards. It is an ideal goggle for wear under helmets. Side shields of soft leather give 3-way protection against heat, injurious light and foreign particles.

Your nearest AO Safety Products Representative can supply you.

QUICK FACTS

LENSES are highest quality Super Armorplate or 6 Curve Armorplate *Calobar* in medium dark or extra dark shades. If only impact protection is required, goggle may be had with *clear* regular Super Armorplate or *clear* 6 Curve Super Armorplate lenses.

BRIDGE is sturdy, reinforcing bar type covered with leather guard to protect against heat, foreign bodies, stray light. 3 bridge sizes and P. D.'s.

TEMPLES available in several lengths are comfortable, *insulated, perspiration proof, heat resistant.*

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

Southbridge, Massachusetts • Branches in Principal Cities

The Juniata

TRADE MARK REGISTERED

UNIVERSAL FOUNDRY SAND

IN MOLDS

JUNIATA Bank Sand has high surface tension and low expansion. The perfect base for bonding. The ideal grain pattern for velvet smooth casting surfaces.

JUNIATA Bank Sand used in facing sands has all the good features of naturally bonded sands but has greater refractoriness and higher permeability.

IN CORES

JUNIATA Bank Sand has exceptional green strength. Requires less cereal binder to eliminate sagging. No clay to absorb oil. Low expansion to prevent metal penetration.

JUNIATA Bank Sand for smooth cores and perfect dimensions after baking.

JUNIATA BANK SAND STANDS ALONE IN ITS FIELD

A. F. S. CONVENTION

BOOTH 327

Great Lakes
FOUNDRY SAND COMPANY—DETROIT
MINERS • PROCESSORS • FOUNDRY, METALLURGICAL AND SAND BLAST SERVICE

FOUNDRY SANDS • SILICA SANDS
SHOT—GRIT—BLAST SANDS
REFRACTORIES • BENTONITE
RE-BONDING CLAYS

Increase Customer Satisfaction

with APEX Products

- ALUMINUM ALLOYS — *for all types of castings*
- ALUMINUM — *for steel deoxidizing and grain control*
- ALUMINUM BASE HARDENERS — *for alloying and grain refining purposes*
- GRAINED ALUMINUM — *for thermit reductions, steel metallurgy, chemical applications, etc.*
- ALUMINUM FLUXES — *for cleansing and grain refining all alloys*
- MAGNESIUM ALLOYS — *for all types of castings*
- MAGNESIUM ANODES — *for cathodic protection*
- ZINC ALLOYS — *for die castings and metal forming dies*

In the Apex laboratories, Apex research and facilities are devoted to producing *better* ingot, analyzing particular problems for foundries who use *all* methods of castings—sand, permanent mold or die casting. Thus, Apex maintains always this high standard: "Best in every test from Ingot to Casting!"

TECHNICAL SERVICES

Spectrographic standards . . . Chemical analytical methods . . . Physical and mechanical property tests . . . Chemical, quantometer and spectrographic analyses . . . Field engineering.

Apex Smelting Company

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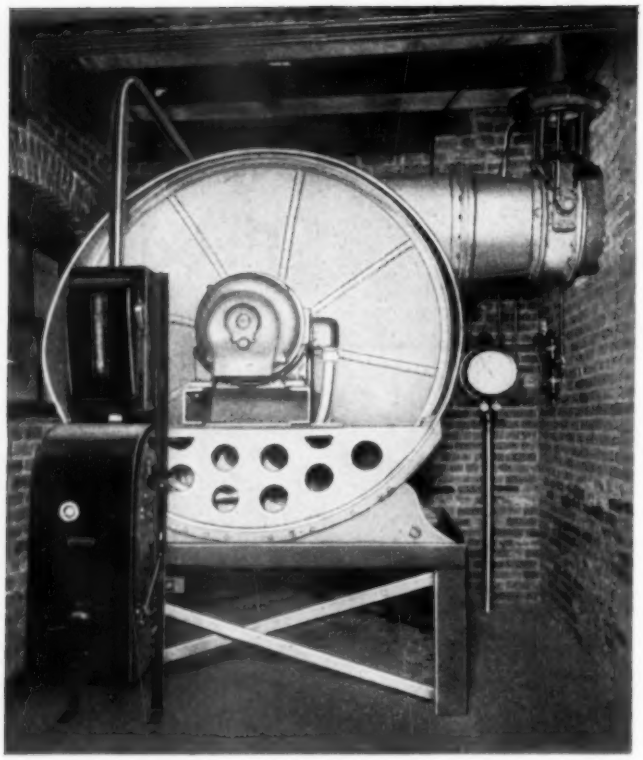
6700 GRANT AVENUE • CLEVELAND 5, OHIO



SPENCER
HARTFORD

IN THE FOUNDRY

The first Spencer Turbo was installed on a cupola in Pittsburgh more than forty years ago, and is still giving satisfactory performance.

As foundry practice improved and became more exacting, the advantages of the Spencer Turbo for foundries became more and more important. Its very simplicity and freedom from shut downs and maintenance for instance became most valuable during the war years when foundries were working at top speed 24 hours a day.

The Spencer Turbo has wide clearances, with only two bearings to grease. It operates quietly, at low speeds and with little vibration. No special foundations are required.

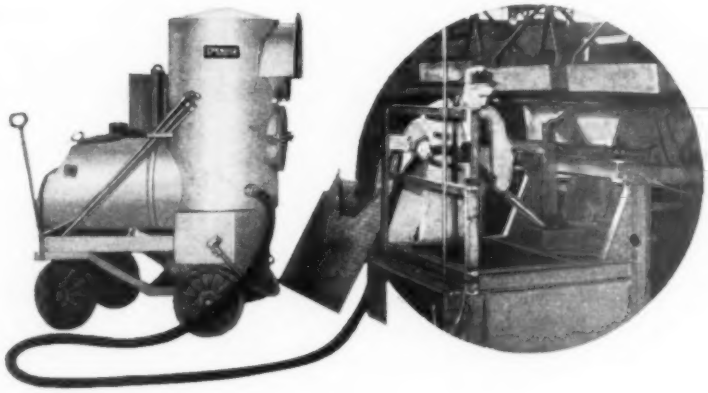
Positive Control: Spencer Turbos deliver a constant pressure of air regardless of cupola loading conditions. Manual control consisting of a calibrated ammeter and a blast gate is standard. Automatic air-weight control with chart readings can be added where required. Ask for the Spencer Foundry Bulletin No. 112.

A Mechanized Foundry Benefits Everyone

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

GOOD HOUSEKEEPING

Spencer Portable Vacuum Cleaners from 1½ to 7½ horsepower are used extensively in foundries to remove overhead dirt and dust and to clean molds, patterns and finished castings. The same machine can be used in other parts of the plant for general housekeeping, or for reclaiming metals, material handling and a hundred other uses along the production line. Bulletins on request.



THE SPENCER TURBINE COMPANY • HARTFORD 6, CONNECTICUT

SPENCER
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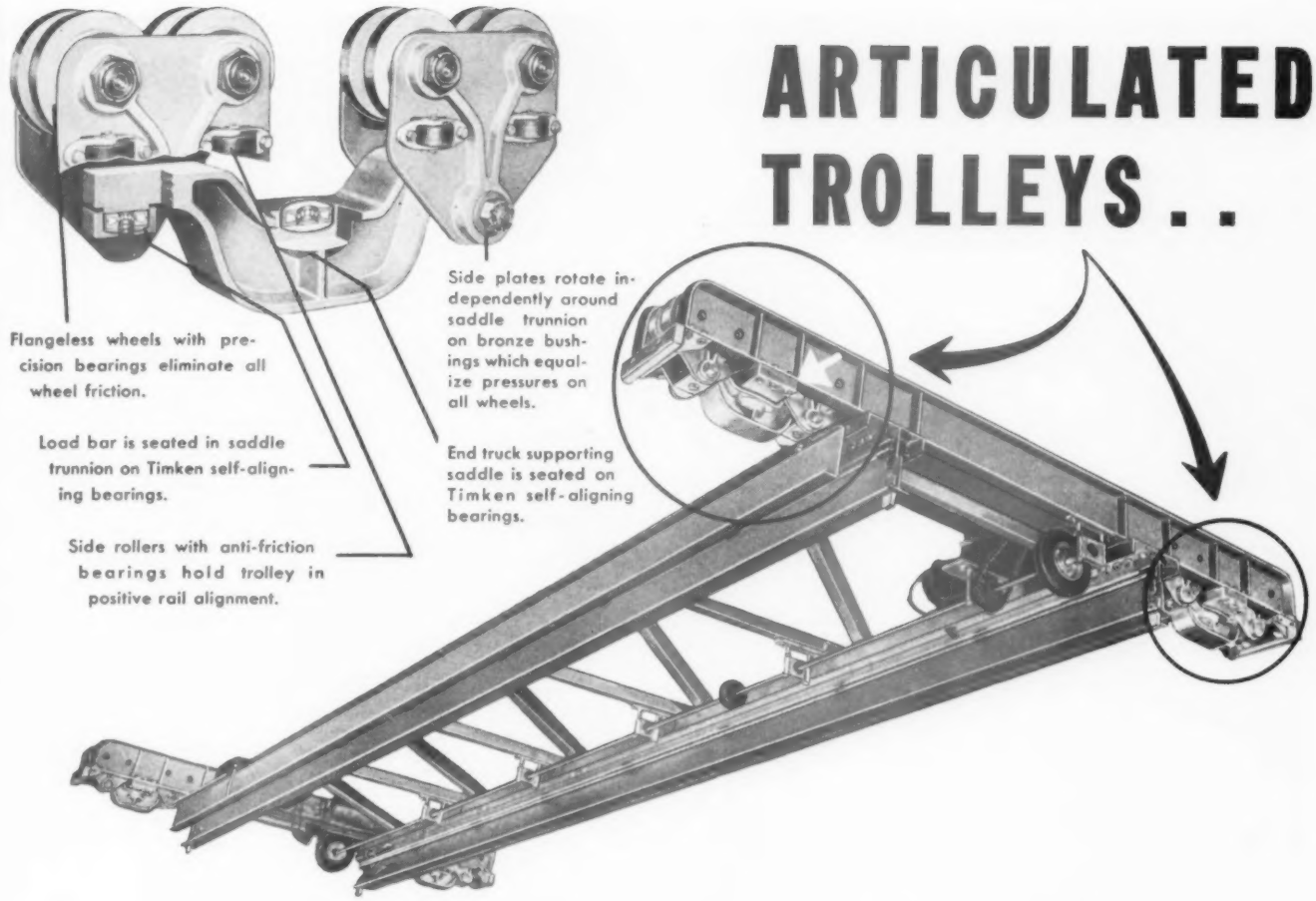
ARTICULATED TROLLEYS . .


Flangeless wheels with precision bearings eliminate all wheel friction.
Load bar is seated in saddle trunnion on Timken self-aligning bearings.
Side rollers with anti-friction bearings hold trolley in positive rail alignment.
Side plates rotate independently around saddle trunnion on bronze bushings which equalize pressures on all wheels.
End truck supporting saddle is seated on Timken self-aligning bearings.

make possible High-Speed, Heavy-Service

AMERICAN MONORAIL CRANES

When each trolley wheel carries its share of the load in perfect alignment with the craneway tracks and all possible friction is eliminated, the result is perfectly articulated trolley travel.

Applied to American MonoRail Cranes, these articulated trolleys permit operating speeds of 500 feet per minute . . . constant service . . . handling loads up to 10 tons. And with this is offered all the flexibility of MonoRail design for *interlocking carrier service between and beyond the craneways.*

Let an American MonoRail Engineer explain all the advantages of these new cranes. Write for Bulletin MF-1 showing the development of American MonoRail Cranes for over-all plant service at low initial and operating costs.

THE AMERICAN MONORAIL COMPANY

13104 ATHENS AVENUE **CLEVELAND 7, OHIO**

MCA offers Quick delivery

# of all forms for all uses

TUNGSTEN

Tungsten Ores
Ferro-Tungsten
Tungstic Oxide
Tungstic Acid
Ammonium Para-Tungstate
Sodium Tungstate
Tungsten Metal Powder
Tungsten Carbide

Tungsten under present conditions will reward every user's close attention. As specialists in the manufacture and use of Tungsten products, The Molybdenum Corporation may be relied on for timely advice and service.

AMERICAN Production, American Distribution, American Control, Completely Integrated.

Offices: Pittsburgh, New York, Chicago, Cleveland, Detroit, Los Angeles, San Francisco, Seattle.

Sales Representatives: American Steel and Supply Co., Chicago; Edgar L. Fink, Detroit, Brumley-Donaldson Co., Los Angeles, San Francisco, Seattle.

Subsidiaries: Cleveland-Tungsten, Inc., Cleveland, O.; General Tungsten Manufacturing Co., Inc., Union City, N. J.

Works: Washington, Pa.; York, Pa.

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MOLYBDENUM CORPORATION OF AMERICA
Grant Building Pittsburgh, Pa.

MCA

new

CP Rammer

for any sand

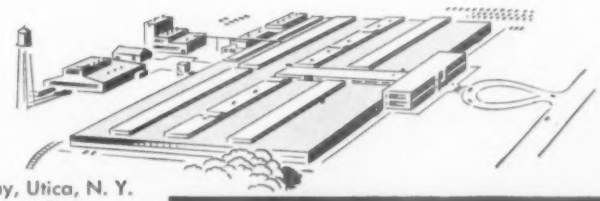
A flexibility from fast, heavy blows to exceedingly rapid, light strokes adapts the CP-25-PV Sand Rammer to any type of sand. This range is made possible by the fine air control of a poppet type throttle valve.

New "pulley valve" design gives smooth, consistent piston action, and provides accurate control of rammer's speed and power. Wear of "pulley valve" parts does not affect the performance of the rammer.

Oil reservoir has ample capacity. There's plenty of front end packing; adjustment is simple. Keyed piston bushing for hexagon rods prevents piston from turning. Exhaust deflector is adjustable. Cylinder is hardened throughout for long life.

Chicago Pneumatic offers both floor and bench model sand rammers in varied sizes to meet every foundry requirement.

Write for full information.



With its half million square feet of floor space, Chicago Pneumatic's new Utica unit is the world's most modern plant for the production of pneumatic and electric tools.

Chicago Pneumatic Tool Company, Utica, N. Y.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Profits Multiply...

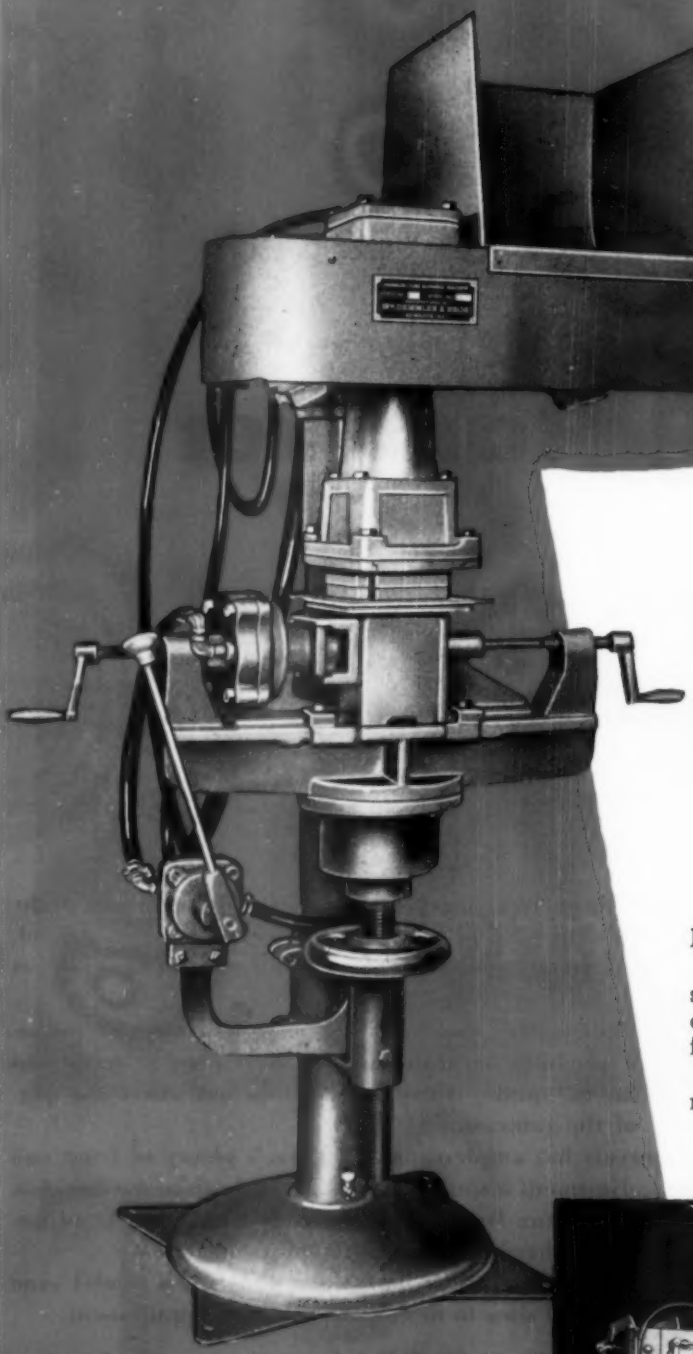
with

DEMMLER

Since 1911, efficient DEMMLER Core Blowers have been making money for foundries large and small.

Their reputation for dependable — trouble-free service, coupled with their ability to produce high quality cores faster at less cost has made them a favorite everywhere!

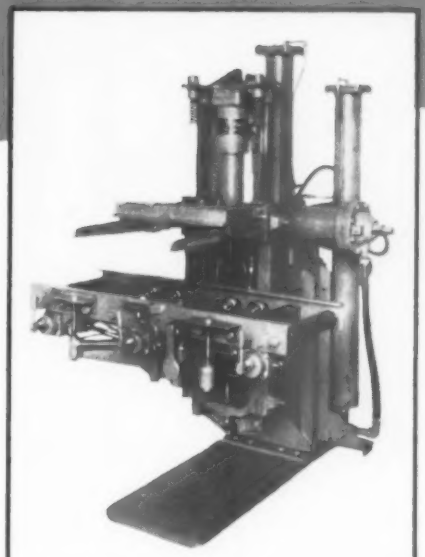
The DEMMLER line is a complete line. There is a machine to meet every core blowing requirement.



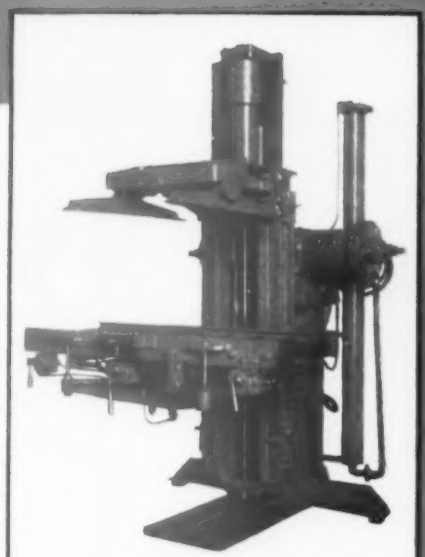
DEMMLER
NO. 55

DEMMLER NO. 1

DEMMLER NO. 3E



DEMMLER NO. 2P
CORE ROLL-OVER
DRAW MACHINE



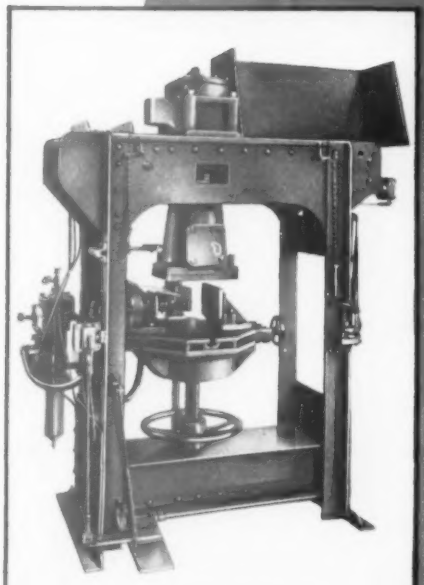
DEMMLER NO. 5P
CORE ROLL-OVER
DRAW MACHINE

Core Blowers

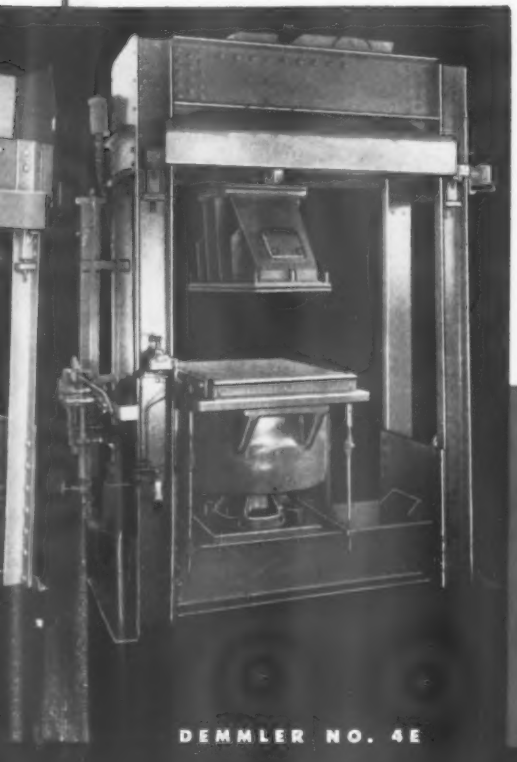
Each machine features both horizontal and vertical adjustments for quick, easy job changes.

Why not join the thousands who depend upon DEMMLER Core Blowers to assure them greater profits through an efficiency that sets the standards for the industry?

Descriptive literature on any of the machines illustrated will be sent on request. Write for yours TODAY!



DEMMLER NO. 2



DEMMLER NO. 4E

Visit the DEMMLER Exhibit at the Foundry Show — Booth No. 1014.

Wm. DEMMLER & Bros
Kewanee, Illinois

... always uniform
... like INTERNATIONAL GRAPHITE ELECTRODES

ICE International GRAPHITE AND ELECTRODE CORP.
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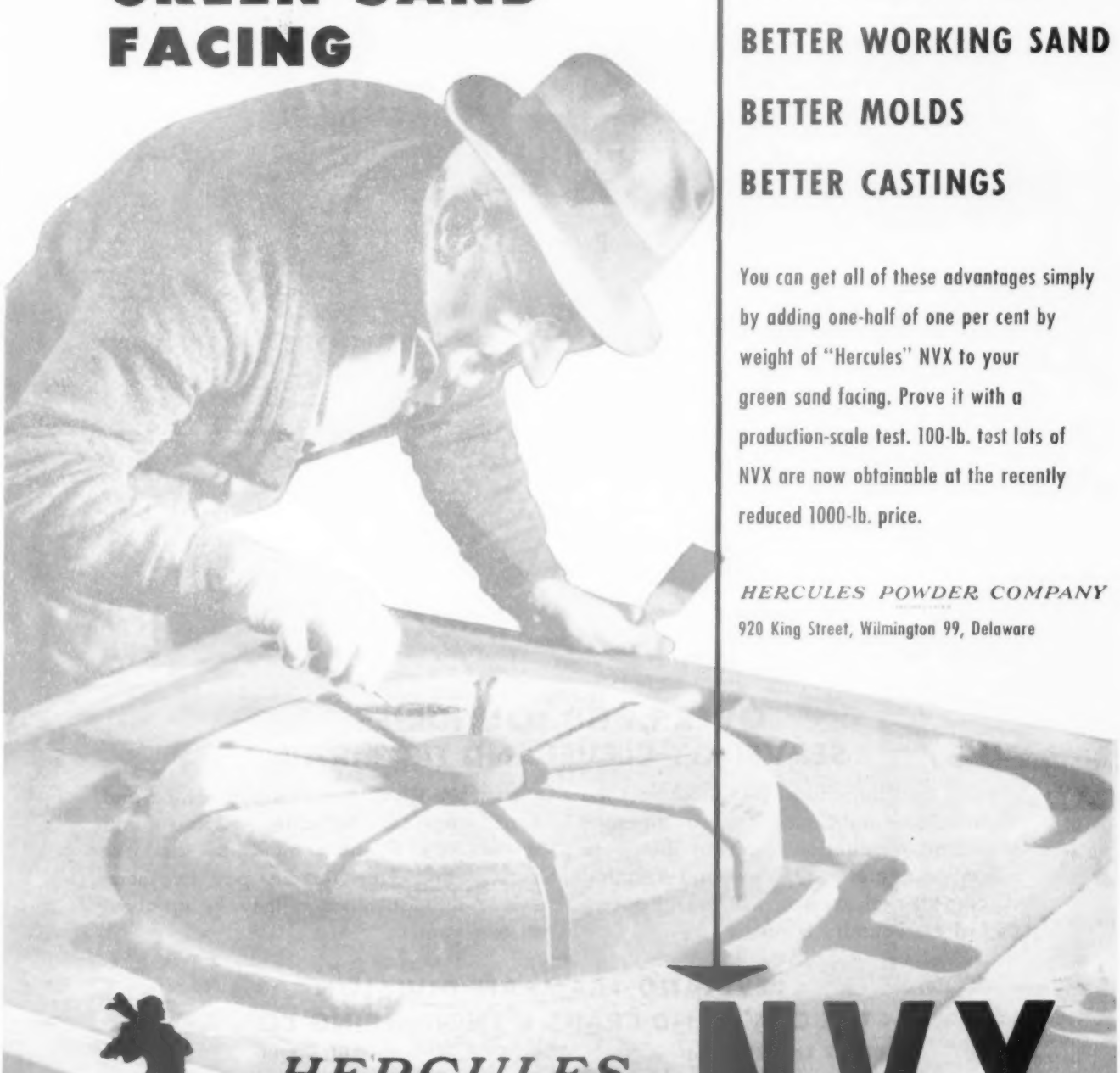
BETTER 4 WAYS

FOR GREEN SAND FACING



BETTER FLOWABILITY

BETTER WORKING SAND

BETTER MOLDS

BETTER CASTINGS

You can get all of these advantages simply by adding one-half of one per cent by weight of "Hercules" NVX to your green sand facing. Prove it with a production-scale test. 100-lb. test lots of NVX are now obtainable at the recently reduced 1000-lb. price.

HERCULES POWDER COMPANY
920 King Street, Wilmington 99, Delaware

HERCULES **NVX**

"HERCULES" IS REG. U. S. PAT. OFF.

NF50-1

SEE
THE CLEVELAND TRAMRAIL *Exhibit*
at the Foundry Show
May 8-12, 1950—Cleveland

SPACE NUMBERS 1204 & 1307
UPPER LAKESIDE HALL . . . . . .

A WORKING EXHIBIT

Cranes, Carriers, Hoists, Switches, etc. as used for foundry operations will be featured in a working exhibit

OVER 1,000 FOUNDRIES SERVED BY CLEVELAND TRAMRAIL

Small and large foundries throughout the United States and Canada are cutting costs, speeding production, making the work easier and safer with Cleveland Tramrail equipment such as you will see in operation at the Foundry Show.

Visit the Cleveland Tramrail exhibit and learn what this versatile equipment can do for you. Keep in mind the fact that most foundry installations pay for themselves through savings they bring about in one year.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3827 East 286th Street — Wickliffe, Ohio

CLEVELAND TRAMRAIL

U.S.

AIR LINE EQUIPMENT

Original

BOWES COUPLINGS

PRESSURE SEATED

AIR VALVES

SINGLE OR MULTIPLE OUTLETS

BLOW GUNS

NIPPLES

MANIFOLDS • LINE OILERS • STRAINERS • HOSE...ETC.

FOR ALL YOUR AIR LINE REQUIREMENTS AT ONE SOURCE, SEE YOUR SUPPLY HOUSE SALESMAN.

WRITE FOR **NEW** CATALOG
Describing complete line of couplings, valves and fittings

U.S. BOWES COUPLINGS • VALVES • BLOW GUNS AND FITTINGS — THE UNITED STATES AIR COMPRESSOR CO. CLEVELAND, OHIO

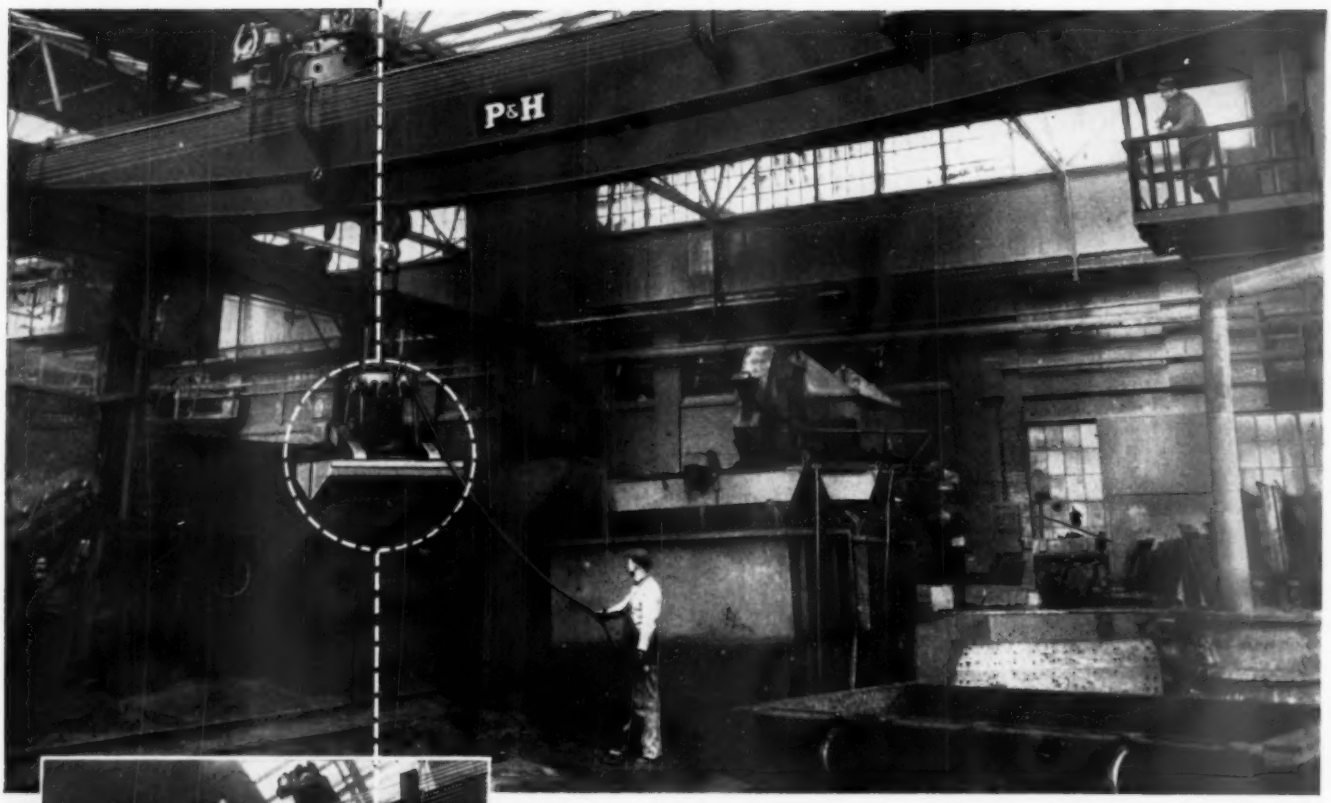
Now Manufactured Exclusively by

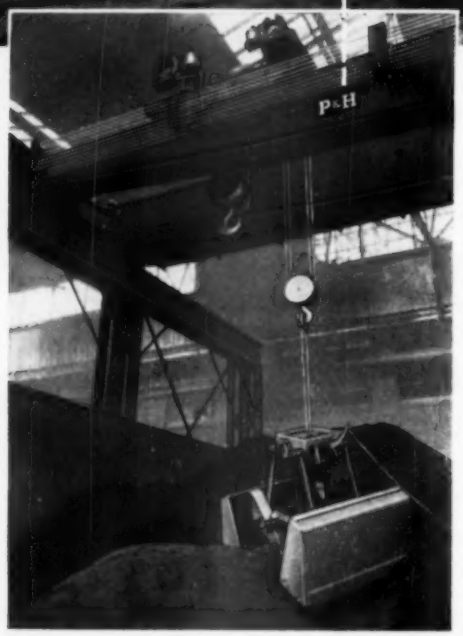
THE UNITED STATES AIR COMPRESSOR COMPANY

5300 HARVARD AVENUE • • • • CLEVELAND 5, OHIO

ORIGINAL BOWES COUPLINGS • VALVES • FITTINGS • AIR COMPRESSORS

P&H SINGLE LINE GRAB BUCKETS





a *"Natural"* in foundry service!

In a matter of seconds you can attach the P&H Single Line Grab Bucket to your crane hook and it's ready to go to work. It's as simple as that — and it provides easy, accurate one-man operation. It works fast, bites deep, picks up clean.

Here's the fast, easy way to handle all kinds of bulk materials — sand, coke, crushed stone, cinders, etc. It's widely used to unload cars, dig pits, fill flasks, etc. A "natural" for foundry use if there ever was one.

Available in capacities from ½ to 2½ yds. Write for all the facts about it. Ask for Bulletin C-27.

P&H

GRAB BUCKETS
4405 West National Avenue
Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION
ELECTRIC CRANES · EXCAVATORS · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS

Better Cores... Faster!

with DELCO 30 Series CORE OIL!

TIME is the most valuable commodity we have. Save time in producing cores, and you save all along the line. Fuel, floor space, customer good will—these are a few items of saving or gain that result from the use of the faster drying, lower temperature baking characteristics of Delco 30 Series Core Oil.

HERE'S WHAT THEY SAY:

Representative foundries report as follows—

- "The big difference is in saving time and fuel in the oven, by cutting down both time and temperature—with no sacrifice of results in the finished core."
- "Results indicated 30 Series Delco Core Oil best suited our general overall work."
- "Best Core Oil I ever used!"
- "We are using one-fifth less oil, and the baking time in the ovens has been reduced approximately two hours."

Results like these appeal to every profit-minded foundryman. You can get similar results in your plant. Let our Cities Service representative aid you in applying the correct grade of Delco Core Oil for your specific requirements. This service is prompt, reliable, valuable—and *free*. Cities Service Oil Company, Chicago, Cleveland, Kansas City, St. Paul and Toronto; Arkansas Fuel Oil Company, Shreveport.

Features of Cities Service 30 Series Core Oil that are building preference throughout the industry:

BETTER PERFORMANCE in core boxes, whether blown or hand rammed, whether sand is washed and dried or crude.

FASTER DRYING TIME without recourse to older types of drying oils.

WIDE RANGE OF WORKING TEMPERATURE—ready for use without pre-conditioning, whether in Texas or Montreal.

BAKES OUT AT LOWER TEMPERATURE, saves time, oven capacity and fuel.

HAS A CLEAN, PLEASANT ODOR.

MADE IN FIVE QUALITY RANGES accommodating all local foundry and core room conditions.

DELCO CORE OILS • ROSINAL LIQUID CORE BINDER • DELCO CORE AND MOLD WASH

CITIES SERVICE

Get more heats... with TASIL linings for your Detroit Electric Furnaces

Modern foundries are reporting outstanding results from TASIL linings in Detroit Electric Furnaces for melting grey iron, Ni-Hard and Ni-Resist, malleable iron and the complete range of copper-base, non-ferrous alloys. TASIL linings stand up for more heats with minimum patching, lowering the refractory cost per ton of metal melted.

TASIL refractories possess many desirable properties that increase furnace lining life. They have high hot load strength; high softening point (3335°); high volume stability throughout the temperature range; excellent resistance to spalling and slagging.

TASIL refractories are endorsed by the Detroit Electric Furnace Division, Kuhlman Electric Company and are made to their specification. TASIL brick and special shapes, as well as Patches and Cements specifically "engineered" for maintaining Detroit Electric Furnace linings are stocked for prompt shipment. See the Taylor representative in your area or write for details on how you can get more heats, and lower your furnace refractory costs with TASIL.

Refractorers to industry since 1864.

Exclusive Agents in Canada:
REFRACTORIES ENGINEERING AND SUPPLIES, LTD.
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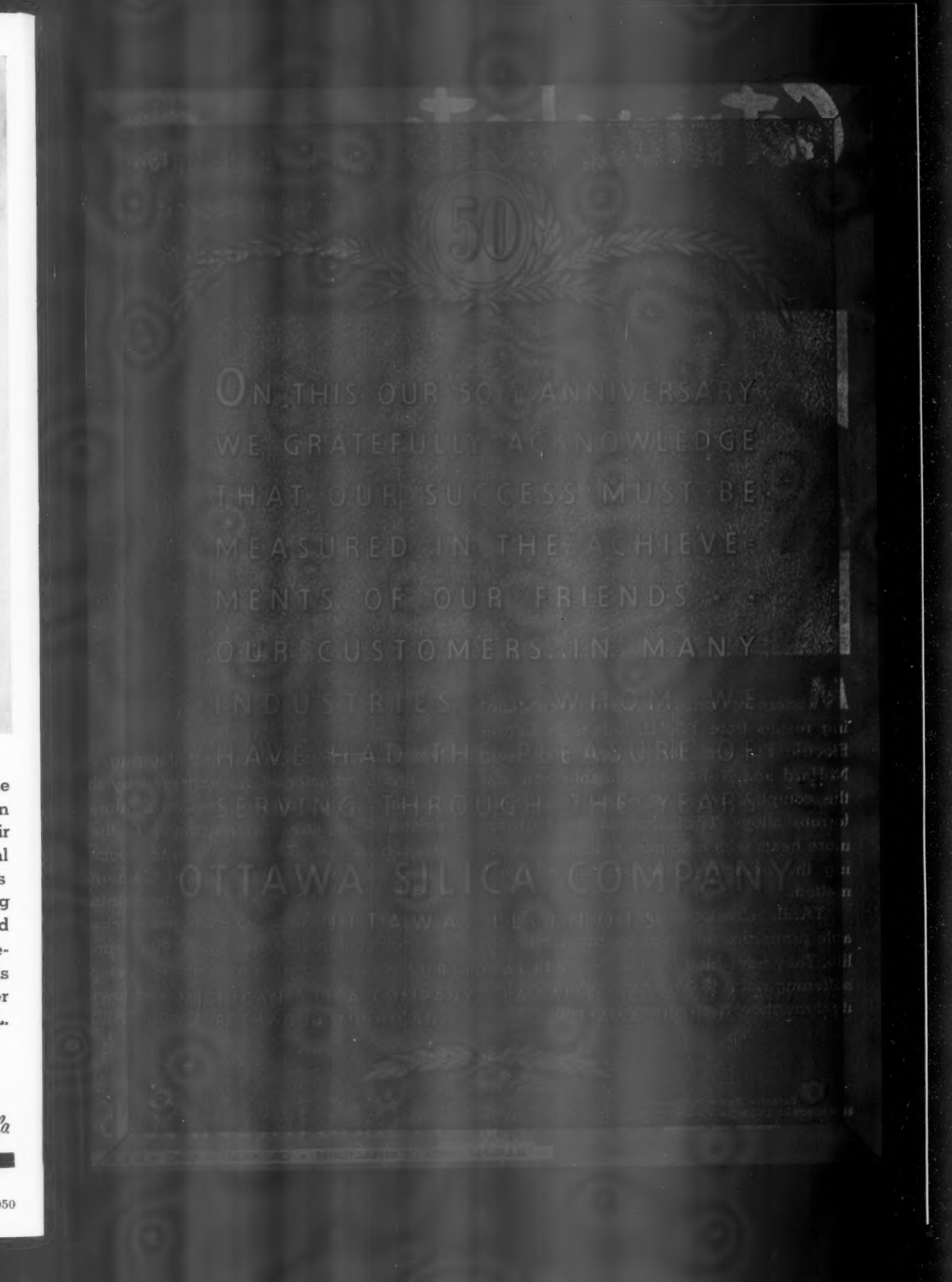
TAYLOR SILLIMANITE REG. U.S. PAT. OFF.

The CHAS. TAYLOR SONS Co.

MANUFACTURERS OF REFRACTORIES • CINCINNATI • OHIO • U.S.A.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ON THIS OUR 50TH ANNIVERSARY
WE GRATEFULLY ACKNOWLEDGE
THAT OUR SUCCESS MUST BE
MEASURED IN THE ACHIEVE-
MENTS OF OUR FRIENDS
OUR CUSTOMERS IN MANY
INDUSTRIES WHOM WE
HAVE HAD THE PLEASURE OF
SERVING THROUGH THE YEARS
OTTAWA SILICA COMPANY
OTTAWA ILLINOIS

A MECHANIZED FOUNDRY BENEFITS EVERYONE

The Robins Conveyors Division of

HEWITT-ROBINS

INCORPORATED

ANNOUNCES

three new ways
to mechanize your foundry operations

THE VIBRA-FEEDER®. . .

The first practical, fully mechanical vibrating feeder. Compact; no auxiliary electrical equipment required. Simple; only two places to lubricate. Vibration-proof; no disturbance of surrounding structures or instruments. Hewitt-Robins engineering and dependability throughout. See it at the show!

THE VIBRA-VEYOR®. . .

A mechanical steel pan vibrating conveyor for handling hot materials and castings at high tonnage per hour. Completely mechanical, foolproof, versatile . . . pans handle any hot material. Can be installed in any length needed. See it at the show!

THE SSC UNIT . . .

A revolutionary Shakeout, Screen and Conveyor in one complete unit! Shakes out flask, screens sand, breaks up lumps, feeds sand to any conditioning unit, and magnetically traps tramp metal; partially aerates the sand. Saves time, floor space and money by performing five basic foundry operations quickly, efficiently and economically. See it at the show!

On display at the Foundry Show . . . Booths 707-709 North Exhibit Hall

HEWITT-ROBINS INCORPORATED
Robins Conveyors Division — **270 Passaic Ave., Passaic, N. J.**

BELT CONVEYORS (*belting and machinery*) • BELT AND BUCKET ELEVATORS • CAR SHAKEOUTS • DEWATERIZERS • FEEDERS • FOAM RUBBER PRODUCTS • FOUNDRY SHAKEOUTS • INDUSTRIAL HOSE • MINE CONVEYORS • MOLDED RUBBER GOODS • RUBBERLOKT ROTARY WIRE BRUSHES • SCREEN CLOTH • SKIP HOISTS • STACKERS • TRANSMISSION BELTING • VIBRATING CONVEYORS, FEEDERS AND SCREENS

A Hand Full of Helps and Hints

on how to slash material handling costs in foundries and metal working plants

These actual authorized job studies show and tell how it is done with

PAYLOADERS

Here's a Job Study of a foundry that uses six Model HA Payloader tractor shovels to pick up, carry, pile, spread, windrow, dump and load sand . . . to handle sprues, slag, bond and broken cores. They've taken many laborious tasks off the backs and arms of men, have cut material handling costs substantially and have speeded foundry production without sacrificing flexibility of operations.

Job Study No. 10 pictures and describes how a combined foundry and machine shop uses Hough Payloaders to unload sand from gondola cars, to handle sand and other materials in the foundry, to transport castings in the foundry and machine shop and to load finished products on trucks for shipment.

Both of these Job Studies are full of cost-cutting ideas and are available without obligation. The Frank G. Hough Co., 703 Sunnyside Avenue, Libertyville, Illinois.

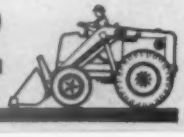
You are invited to visit our Exhibit at the Foundry Show—Booth No. 1008

SAY HUFF

HOUGH

PAYLOADER

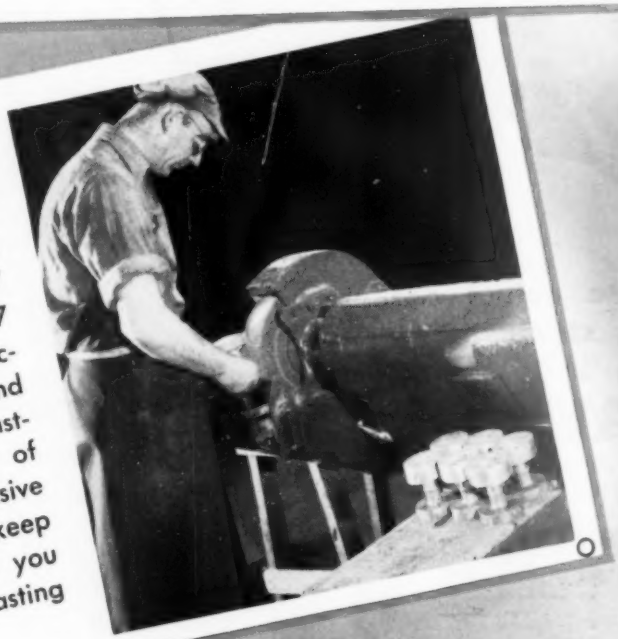
Manufactured by THE FRANK G. HOUGH CO.



To Increase your Production . . .
To Lower your Grinding Costs . . .
Specify NORTON WHEELS—

Each specially designed for a definite grinding job

Wheels for Ferrous Foundries — Many foundries grinding steel or annealed malleable iron castings have discovered that Norton wheels of tough, sharp ALUNDUM or 57 ALUNDUM abrasive with B-5 or B-7 resinoid bond increase their production and cut their grinding costs. And many others, grinding gray iron castings, depend on Norton wheels of strong, sharp CRYSTOLON abrasive with B-5 or B-7 resinoid bond to keep their grinding costs down. Are you using these fast-cutting, long-lasting wheels?



Wheels for Nonferrous Foundries — You get fast, clean cut and extra long life which add up to lower grinding costs when you select Norton wheels of strong, sharp 37 CRYSTOLON abrasive and special B-5 or B-7 resinoid bond for use on your high speed grinders. You get these same cost-cutting features when you select CRYSTOLON wheels with vitrified bond for your slow speed grinders too — and don't forget that Norton wheels are available with special treatments which prevent loading and glazing.

Making better products to make other products better

See these new wheels in action at the Foundry Show

NORTON *Reinforced* Hub Wheels — Now you can remove gates and risers from large castings quickly, safely and economically, by notching them with the new *Reinforced* Hub Wheel and then knocking them off with a sledge. Many foundries are also using the new wheels for removing mold marks and for smoothing up castings. These strong, reinforced wheels may be used on your right-angle or straight-shaft portable grinders without danger of wheel breakage.

Cut-off Wheels — Strong, safe NORFLEX Reinforced Resinoid wheels have replaced conventional resinoid or rubber bonded cut-off wheels on many jobs where wheel breakage has been high. These wheels — mounted on Tabor-type cut-off machines — will remove sprues, gates and risers from small nonferrous castings quickly and easily. Other types of resinoid and rubber bonded wheels are available for cutting higher tensile strength metals and non-metallic materials.

Discs — Foundries everywhere are reducing surfacing costs on aluminum brass and gray iron castings with Crystolon discs with special B-5 resinoid bond. And they're reducing costs on steel and annealed malleable iron castings with Norton discs of fast-cutting 57 ALUNDUM abrasive and B-5 resinoid bond. You'll find these discs available in exactly the right sizes and with all types of mountings commonly used, including inserted nut and plate mounted.

Mounted Wheels and Mounted Points — You can remove excess metal from hard-to-get-at places quickly and easily with Norton Mounted Wheels and Mounted Points. They're available with fast-cutting 38 ALUNDUM abrasive for jobs on steel and steel alloys — with 37 CRYSTOLON abrasive for jobs on cast iron, chilled iron and nonferrous metals, and in over 200 standard sizes and shapes.

Test these cost-cutting Norton products on your grinding jobs. Contact your Norton abrasive engineer or distributor for full details.

NORTON ABRASIVES

NORTON COMPANY, WORCESTER 6, MASS. • Warehouses in Five Cities • Distributors in all Principal Cities

UNITED STATES ELECTRICAL TOOLS

PROVED QUALITY
PROVED ECONOMY
PROVED PERFORMANCE

ADJUSTABLE SPEED SNAGGING GRINDER

For heaviest type production grinding where more power is required than on the average production job. Equipped with semi-enclosed, constantly lubricated four-speed drive transmission enabling operator to maintain efficient peripheral speed for the full life of the wheel. The speed lever is interlocked with guards which makes it impossible to increase speed unless wheels are worn down sufficiently to justify speed change. Electric interlock prevents operation of machine unless gears are in mesh.

FOUR SPEED CHANGES

FOR VITRIFIED OR HIGH SPEED WHEELS. WHEEL GUARDS ADJUSTABLE TO WHEEL WEAR

THE ENTIRE U. S. LINE is precision-designed and precision - engineered and built to turn out satisfactory jobs on production or maintenance . . . and to give you

more work...per man...per hour per job and no "per-haps"

MODEL 69

CONTACT YOUR JOBBER for

drills
grinders
surfacers
polishers
sanders
tappers
hole saws
buffers
flexible shaft machines and other tools

The UNITED STATES ELECTRICAL TOOL *Co.*

CINCINNATI, OHIO

A BULL'S-EYE
the first time and every time with

UNIVERSAL FLASK PINS and BUSHINGS for cope and drag

Cope and drag alignment troubles are a thing of the past once you install Universal precision made standardized Flask Pins and Bushings. When Universal closing pins are used, *valuable production time is saved on each operation* because Cope Bushings are quickly guided to the Drag Pins. Universal Flask Pins and Bushings are hardened and ground for *maximum resistance to wear,* adding greatly to their productive life. Design permits longitudinal expansion to compensate for metal heat, without affecting accurate alignment. Universal Flask Pins and Bushings are made in standard sizes and shapes. Special types and sizes to order. *Write for illustrated folder.*

UNIVERSAL ENGINEERING COMPANY

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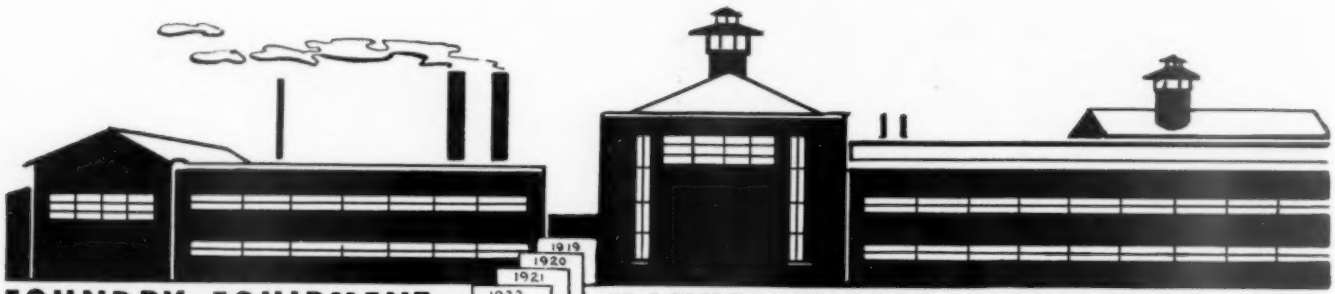
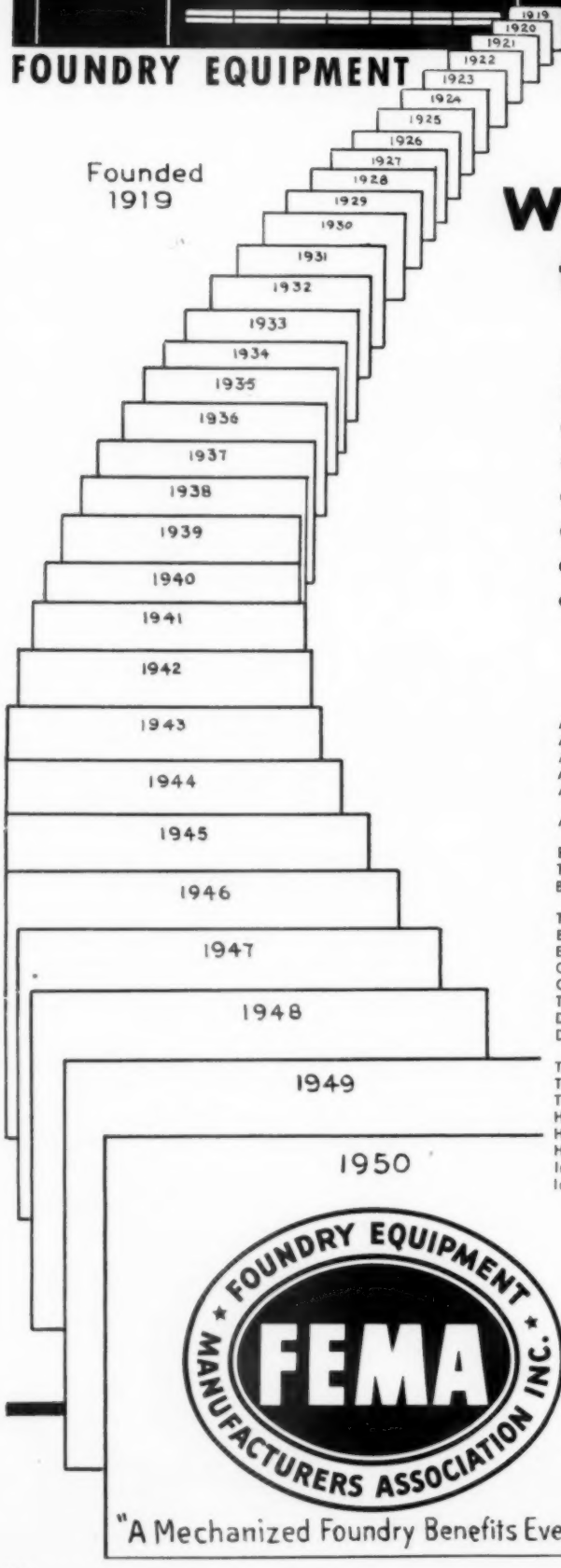


FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION, INC.



What F. E. M. A. does for the Foundry Industry

- Fosters member co-operation
- Improves trade relations
- Promotes industry recognition
- Stimulates foundry research
- Disseminates progress reports
- Co-operates with allied organizations
- Compiles trade information
- Stimulates better foundry equipment

MEMBERSHIP ROSTER

Ajax Flexible Coupling Co. Inc.
Allis-Chalmers Manufacturing Company
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American Air Filter Co. Inc.
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Herman Pneumatic Machine Company
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FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC.
FEMA

"A Mechanized Foundry Benefits Everyone"

A Mark of Product Reliability fostered through progressive group activity and leadership in serving the foundry industry

Let Houghton measure your core oil problem . . .

There's a Houghton "tailor-made" core oil to fit your needs

Very likely a standard proven product in the HY-TEN 300 series of core oils will meet your needs for an economical product for sand-oil mixes.

But your core problem may be different. There may be variables which require a diagnosis of the procedure, a new formula, perhaps a special oil.

If that's the case, after thorough investigation we'll recommend and help you test an oil made specially to meet such conditions.

That's why we call them "tailor-made," to fit your needs. Over half a century of experience in core binders deserves your consideration. Why not use that experience? Why not try the Hy-Ten 300 series, and see for yourselves the benefits of better casting you can get? Write E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33.

HY-TEN

"Tailor-made" core oils—at "ready-to-wear" prices!

OTHER HOUGHTON PRODUCTS for the foundry include grinding oils, core box cleaners, wetting agents, fortified lubricants, heat treating salts, packings, leather belting.

Thermex

HIGH FREQUENCY

CORE BAKING

APPARATUS

THERMEX—T. M. Reg. U. S. Pat. Off.

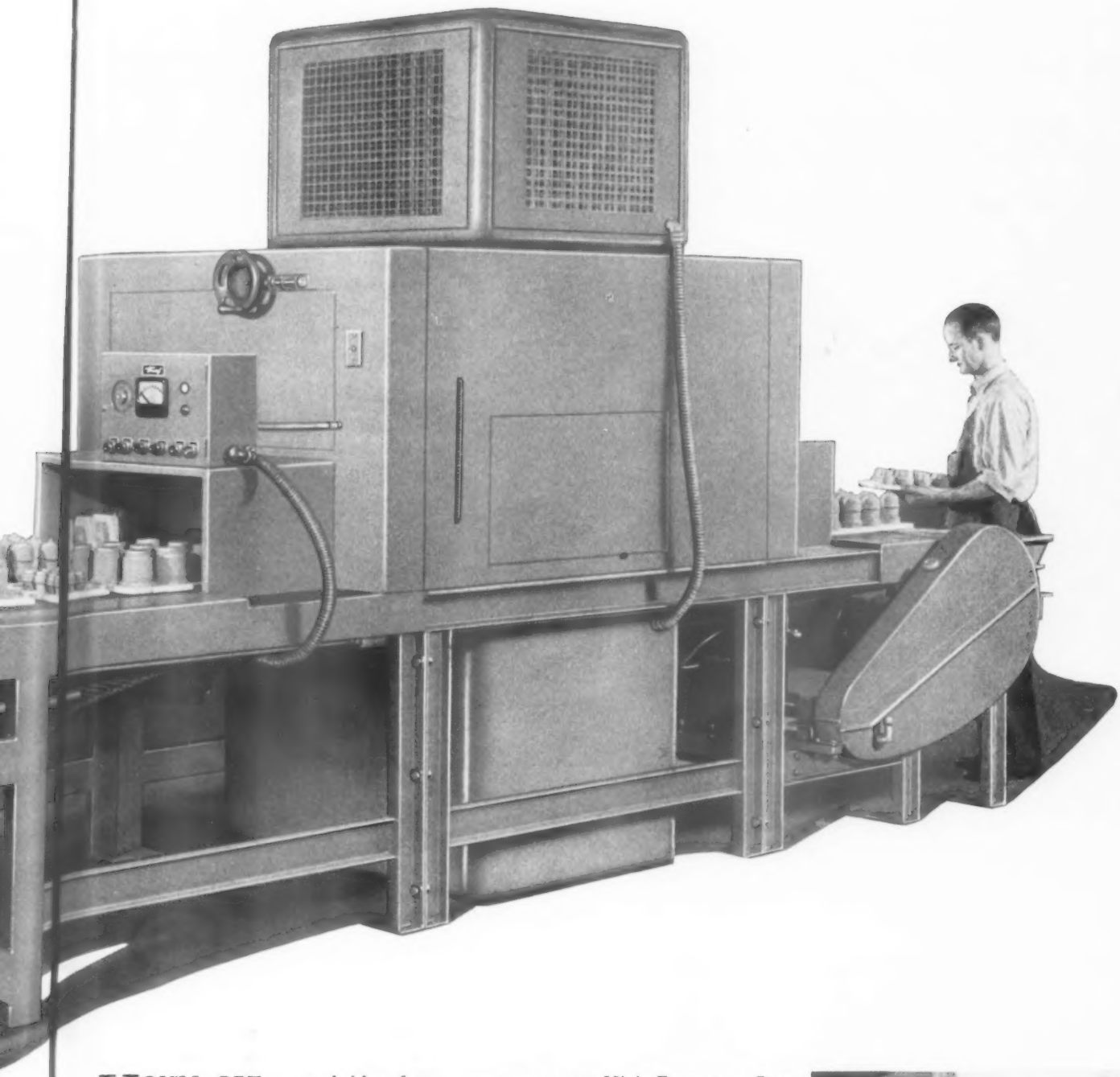
SEE IT IN ACTION!

Introducing the sensational NEW "DRI-BOX"

Blow-in Type Combination Core Box and Drier Precision-Made of Durable Plastic

at the Foundry Show Booth 1317

THE GIRDLER CORPORATION • Thermex Division • Louisville 1, Kentucky



YOU'LL GET a good idea for really *cutting costs* when you visit us at the Foundry Show!

You'll see the new, compact, conveyorized THERMEX High Frequency Core Baking Apparatus on the job in our booth . . . baking cores in minutes on a continuous basis. You'll see how it can increase coreroom yields from 60% to more than 90% . . . how it cuts the number of driers needed . . . how it simplifies flow of production and operations all down the line. And you'll see how Thermex high frequency heating, by baking cores from within, produces *better cores* . . . no burned or broken surfaces . . . fewer casting rejects.

If you can't come to the Show, write for complete details on the new THERMEX High Frequency Core Baking Apparatus!

See how *Thermex* can cut your costs!

- **Simple to install.**
- **Uses synthetic resin binders. Cuts mulling time.**
- **Cuts trucking and racking time.**
- **Baking takes only 20 seconds to 2 or 3 minutes.**
- **Uses power only during actual baking.**
- **Requires fraction of usual number of driers.**
- **Produces perfect cores . . . cuts casting cleaning time.**
- **Minimizes rejects of cores and castings.**
- **Cuts core-baking maintenance costs.**

See the new "Dri-Box" too!

Developed by Thermex engineers, the "Dri-Box" is a blow-in type combination core box base and core drier. Precision-built of tough, durable, lightweight plastic, it does not stick to cores . . . remains free of carbon deposits. Virtually eliminates core breakage. Doubles core-making output. See it at the Show or write for details.

extra service for your equipment when "WEAR-RESISTED" with AIRCO hardfacing alloys

Because of the hardness and other desirable characteristics of these alloys, they provide high resistance to all types of wear—abrasion . . . impact . . . heat . . . corrosion. One application often adds 2 to 25 times longer service life to *worn or new* parts . . . big dividends in savings of "down-time" and replacements.

There is an Airco alloy available for oxyacetylene flame or electric arc application to meet all types of wear conditions.

1. ***Severe abrasion and medium impact***
2. ***Shattering impact and abrasion***
3. ***Severe impact and abrasion***
4. ***Sliding abrasion and impact***
5. ***Extreme earth abrasion***
6. ***Corrosion and heat.***

Constant research is developing new alloys to meet special wear problems as they occur.

If you have parts or tools subject to any type of wear, it will pay you to investigate the savings you can make in maintenance and replacement costs by using Airco Hardfacing Alloys.

For further information about Airco's complete line of "wear-resistant" alloys, write your nearest Airco office or Authorized Dealer for a free copy of the Hardfacing Alloys Catalog.

More news about AIRCO products

FOR SEVERE IMPACT AND RESISTANCE TO ABRASION
Airco No. 388 Electrode

A shielded arc electrode sufficiently high in alloy content to produce a deposit bearing approximately 9% chrome and 0.9% carbon. This alloy content results in a weld metal deposit which is essentially martensitic.

Operators will find that the exceptionally fine arc action of Airco No. 388 increases both the speed and quality of their work.

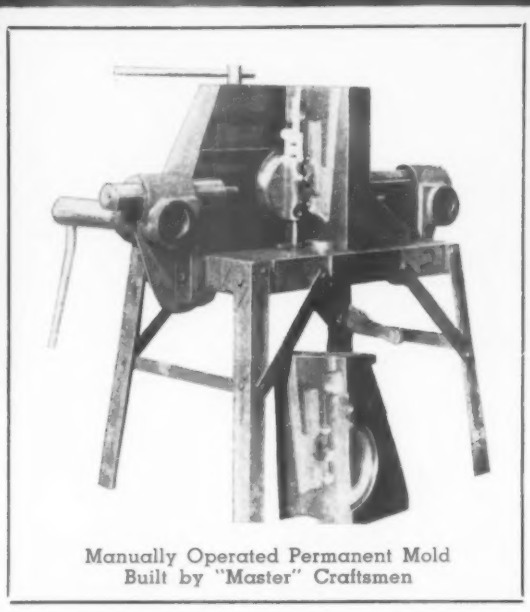
FOR RESISTANCE TO EXTREME EARTH ABRASION
Airco Tungtube
Nos. 8, 10, 20, 30 and 40

These are fabricated rods of tungsten carbide particles encased in a steel sheath. The various Tungtube numbers indicate the screen size of the tungsten carbide particles contained within the tube. With its extreme hardness tungsten carbide ranks second only to the diamond in earth cutting efficiency. It is accepted as the standard means of cutting non-metallic substances; such as, coal, shale, and granite. It is recommended for core bits, fishtail bits, road plows, coal cutter knives, plow shares and similar equipment subjected to extreme earth abrasion.

CORROSION — ACID RESISTANT ALLOYS FOR WELDING HARDER GRADES OF ALUMINUM BRONZE
Airco Nos. 100, 116, 120, 125 and 130 Electrodes

For joining aluminum bronze or other metals and combinations of dissimilar metals—and for overlays on bearing surfaces, machine parts, dies, etc. The deposits made with these electrodes are corrosion and acid-resistant and will also retard wear from abrasion and impact.

AIRCO **AIR REDUCTION**
Offices in Principal Cities



Manually Operated Permanent Mold
Built by "Master" Craftsmen

Patterns and Permanent Molds Planned

. . FOR LOWER CASTING COSTS . .

The "Master" Wood Shop

"Master" craftsmen take great pride in their ability to furnish the exact mold or pattern to solve specific casting problems. A pride backed by a long record of achievement in lowering production costs to a minimum. Their highly specialized experience on all types of permanent molds, wood and metal patterns can be helpful to you. Why not send your blueprints or sample casting for a quotation? No obligation.

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF PERMANENT MOLDS—PNEUMATIC DRAW TABLES
WOOD AND METAL PATTERNS—ACCURATE SCALE MODELS

MASTER PATTERN COMPANY

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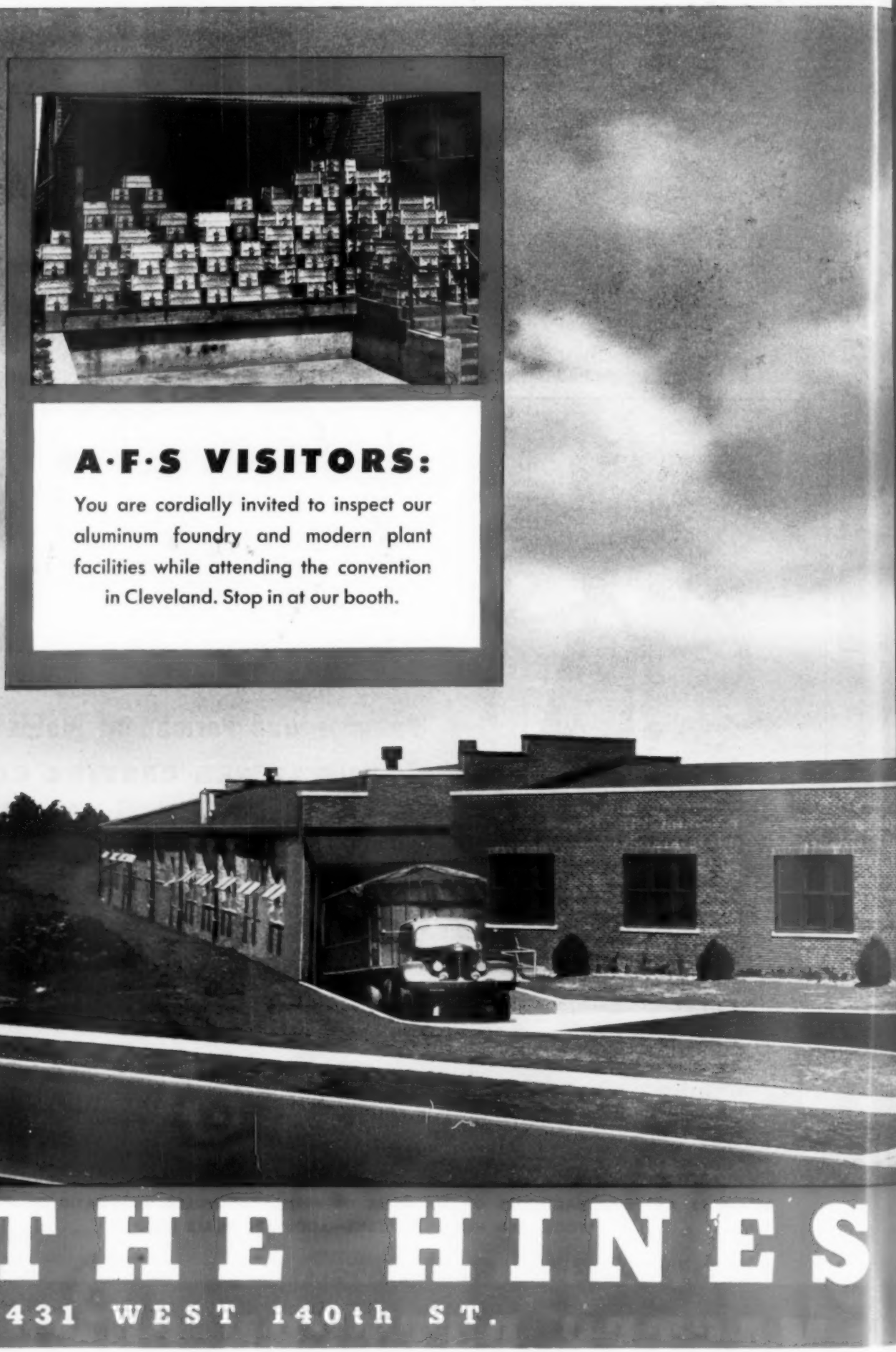
A·F·S VISITORS:
You are cordially invited to inspect our aluminum foundry and modern plant facilities while attending the convention in Cleveland. Stop in at our booth.
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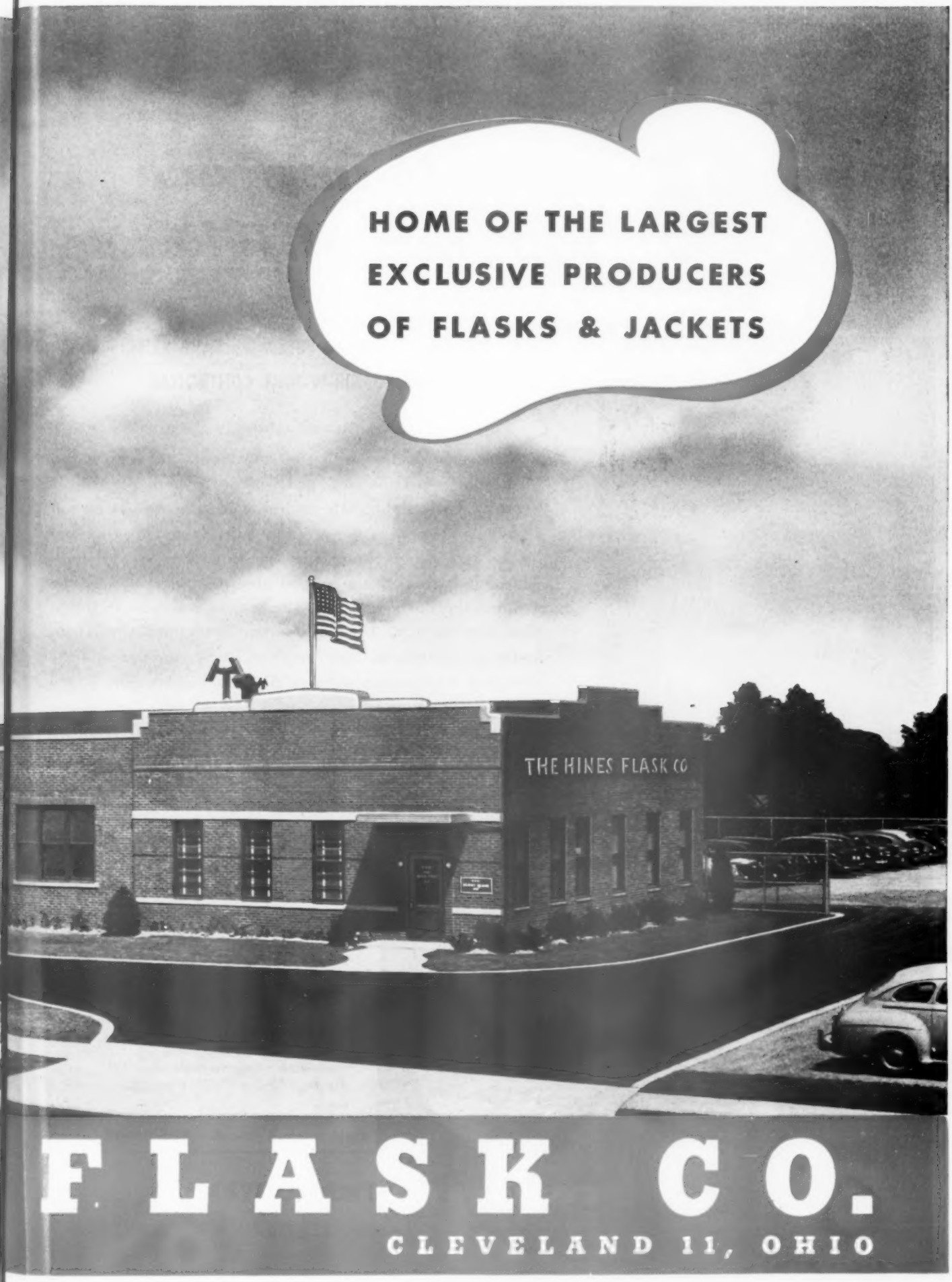
3431 WEST 140th ST.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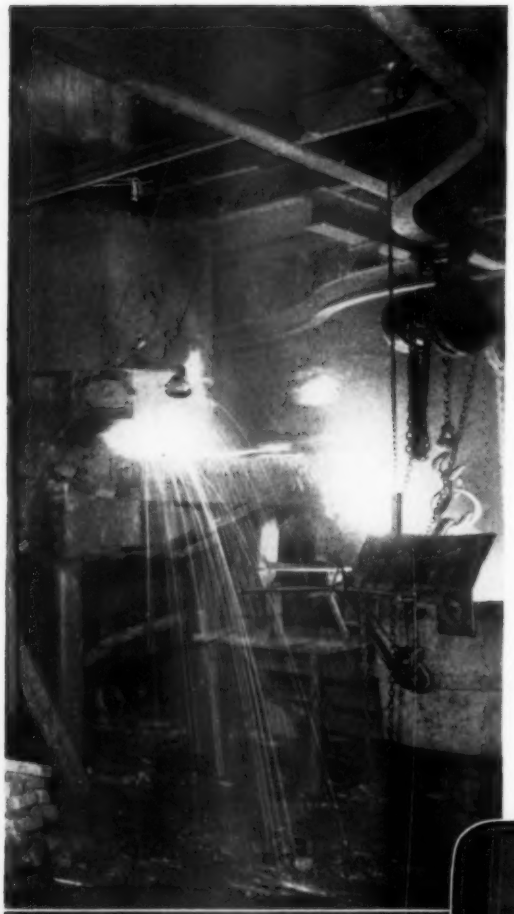
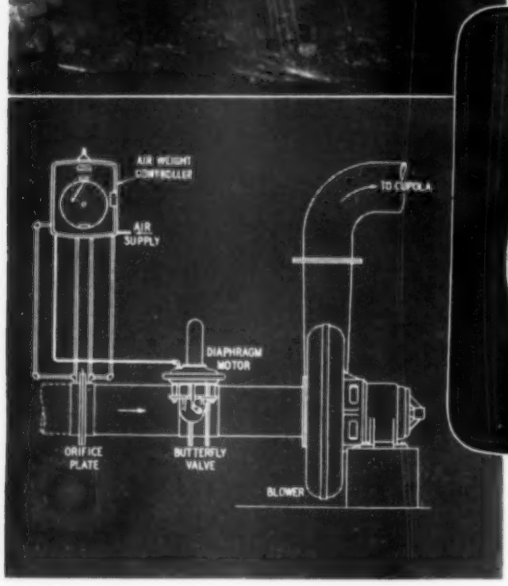
EXCLUSIVE PRODUCERS
OF FLASKS & JACKETS
THE HINES FLASK CO
FLASK CO.
CLEVELAND 11, OHIO

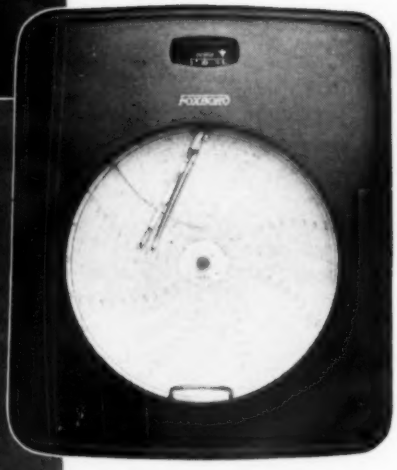
4 ways to improve foundry efficiency



SAVE PIGGING . . . SAVE FUEL . . . SAVE REJECTS WITH THE FOXBORO AIR-WEIGHT CONTROLLER

You get good castings with your first pour, and *every* pour, when your cupola is equipped with a Foxboro Air-Weight Control! Through accurate control of blast by *weight* instead of volume, it supplies the precisely correct amount of oxygen for the coke charge. Automatically compensates for variations in temperature and atmospheric pressure. Regardless of the weather, the Foxboro Air-Weight Control makes *every day* a good pouring day. The benefits are better quality castings, better combustion, and more uniform heats. And you save the time and fuel wasted through needless pigging. Over 1200 cupolas now equipped with Foxboro Air-Weight Control are proving its advantages. Send for bulletin describing complete details. **The Foxboro Company, 32 Neponset Ave., Foxboro, Mass., U.S.A.**



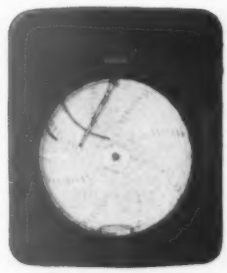


The new Model-40 Air-Weight Controller

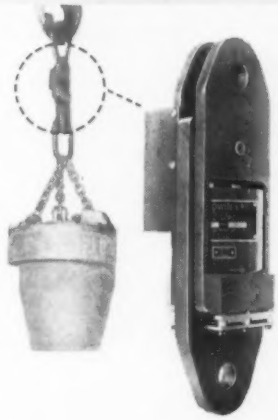
Designed to meet today's requirements for higher operating pressures due to increased production rates, mechanical charging, and variable material sizes.

Stop cupola troubles before they start with the Foxboro Windbox Pressure Recorder

Continuous pressure records provided by this instrument enable operator to keep close tabs on cupola conditions. Results of blast restrictions, such as clogged tuyeres, or bridging over of the charge, are visually indicated. Proven in hundreds of plants, the simple, sturdy Foxboro windbox pressure recorder is a valuable addition to any cupola.



Eliminate double handling in weighing materials with the Foxboro Crane Weight Recorder Save time and work in weighing cupola charges and other foundry materials being loaded or unloaded. The Foxboro Dynalog* Crane Weight Recorder, in conjunction with the Foxboro-Baldwin Force Cell, measures and records the weight while the materials are on the crane. Assure instant, accurate weighing by the simple reading of an instrument conveniently located. (Typical installation of Force Cell is shown at right.) *Reg. U.S. Pat. Off.



Keep dew point constant in blast air with the Foxboro Blast Humidity Measurement and Control A Foxboro Dewcel, in conjunction with a Dynalog Recorder, makes a continuous, accurate record of the blast air dew point. With the addition of a Foxboro Control System, either a constant high moisture content can be maintained very simply (by control of steam or water spray), or dehumidifying equipment can be controlled to maintain constant low dew point. Simple to install, dependable in operation, moderate in cost. Foxboro's unique Dewcel is illustrated at right, with the Dynalog Recorder.

OTHER FOXBORO INSTRUMENTS FOR THE FOUNDRY . . . INCLUDE EQUIPMENT FOR THE BETTER CONTROL OF:

Core oven temperatures — Sand dryer temperatures — Plant air system pressures
Annealing and normalizing temperatures — Plating and cleaning bath temperatures
Non-ferrous pouring ladle temperatures

See them at the Foundry Show!
Booth 705 — North Exhibit Hall

INSTRUMENTS BY FOXBORO Reg. U.S. Pat. Off.

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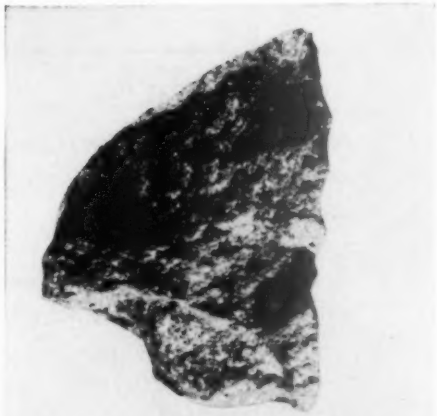
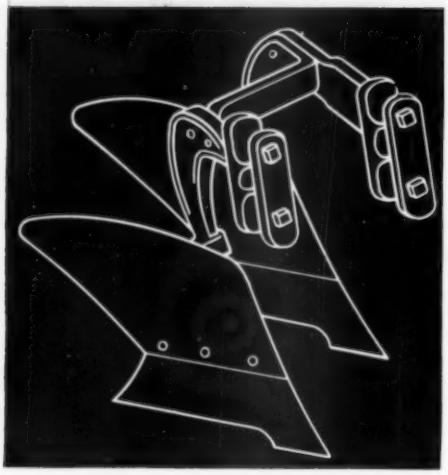
for maximum stock removal



ALOXITE TP
ANGULAR TOUGH SHARP
for medium to heavy service



ALOXITE TPC
ANGULAR MEDIUM TOUGH SHARP
for light to medium service

ALOXITE TPL
VERY ANGULAR EXTREMELY SHARP FRIABLE
for stainless steel and non-ferrous metals

The series of ALOXITE TP aluminum oxide grain by CARBORUNDUM is uniform, dependable, properly shaped, and surface-treated. They give efficient polishing performance on every job from cutlery and surgical instruments to heavy agricultural equipment.

For further information on how they help increase production and cut costs, write for new booklet "Abrasive Grain and Powders by CARBORUNDUM". Bonded Products and Abrasive Grain Division, The Carborundum Company, Niagara Falls, New York.

ABRASIVE Grain and Finishing Compounds by

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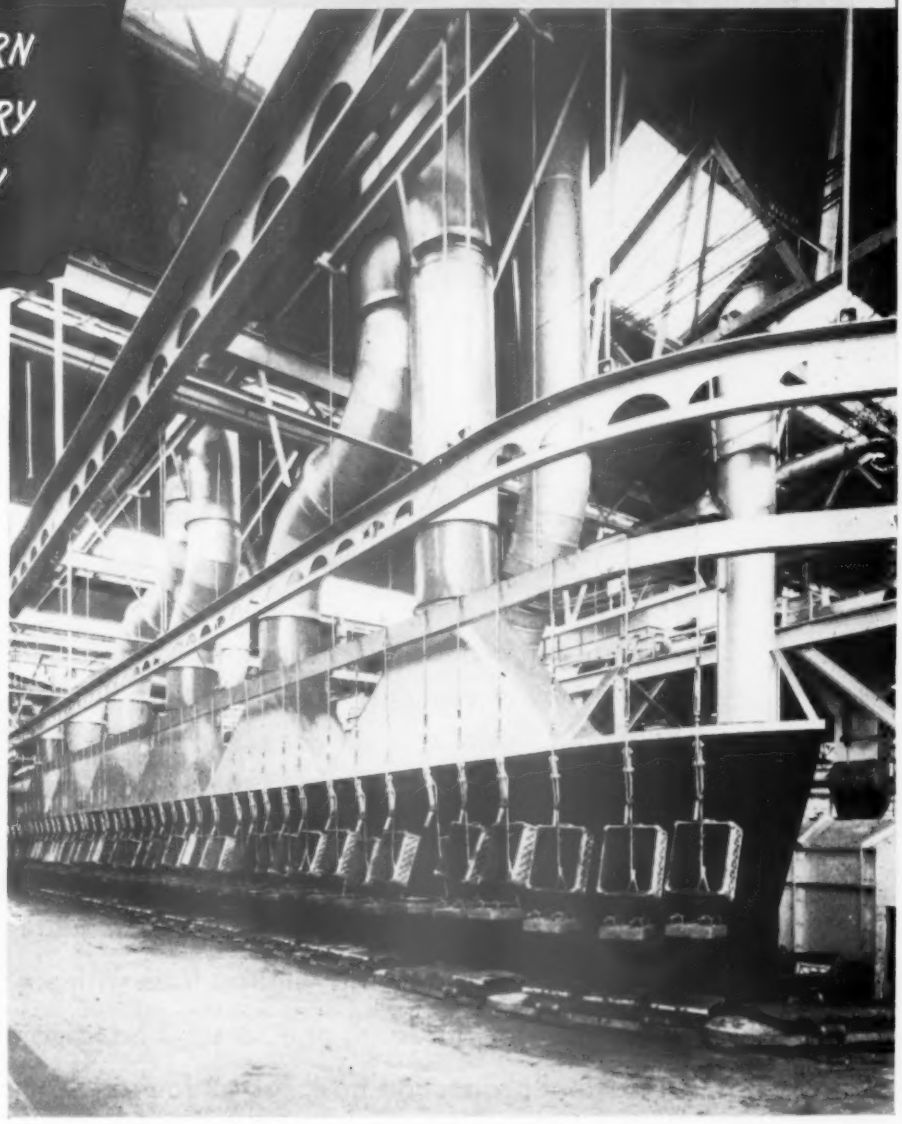
"Carborundum" and "Aloxite" are registered trademarks which indicate manufacture by The Carborundum Company

Smoke and Fumes GONE WITH THE WIND

...IN THIS MODERN SOUTHERN FOUNDRY INSTALLATION BY KIRK & BLUM



WHEN hot metal meets moulding sand, there's bound to be smoke and fumes. But there's no need for smoke and fumes to contaminate the air in a modern well-ventilated foundry. At the pouring station in one of the south's new gray iron and steel foundries, smoke and fumes are not a problem.

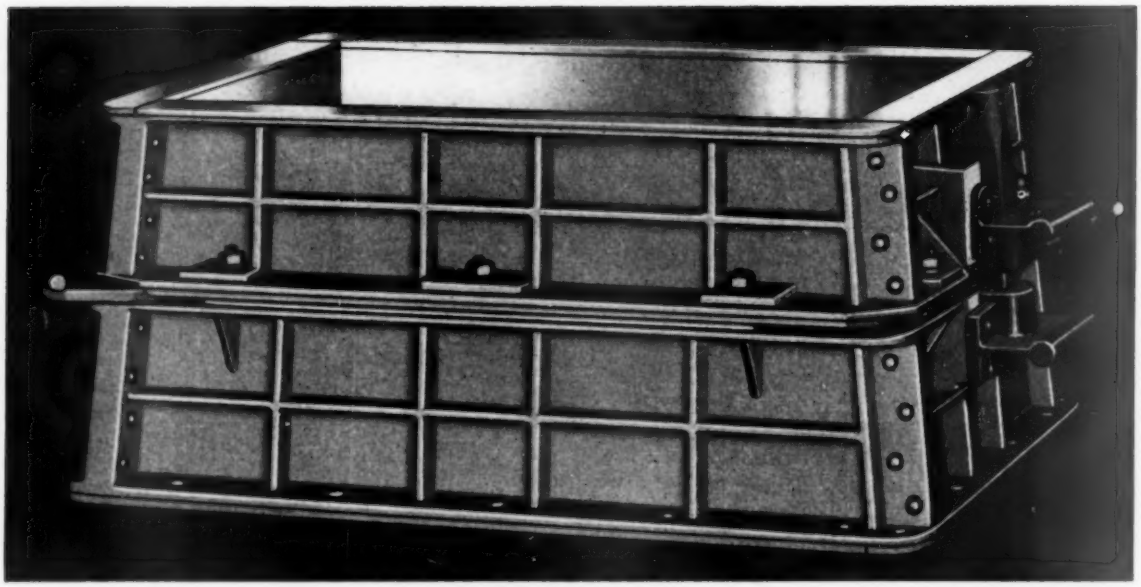
All piping is installed in accordance with A. F. A. specifications. All sections are joined by gasketed companion angle rings, with conveniently located clean-out doors.

This modern smoke and fume control system was fabricated and installed by Liberty Engineering and Mfg. Co., a division of Kirk & Blum. For any foundry dust, fume, smoke or ventilation need, consult KIRK & BLUM, an organization of engineers and craftsmen . . . experienced in design, fabrication and installation of complete systems. For detailed literature and information write The Kirk & Blum Mfg. Co., 2808 Spring Grove Ave., Cincinnati 25, Ohio.

FOR CLEAN AIR . . . THE INVISIBLE TOOL

KIRK AND BLUM

DUST & FUME CONTROL SYSTEMS



Flask Equipped With ¾" Square Pins.
Several Types Of Pins To Choose From

50%

Increase in production is reported by a large midwest producer of Lawn mower castings, after installing "Diamond Featherweight magnesium flasks".

50% more molds per floor with less fatigue to the molder was attained.

Strong and light in weight, The Diamond Featherweight is the fastest and easiest operated flask on the market.

Fast operating sand strip releases flask with ease from the mold.

No clogging with sand, and no sand hanging in the corners.

The ideal production flask for all foundries.

We also manufacture a complete line of Wood Flasks, both snap and slip. Steel and Aluminum Jackets, steel and aluminum core plates, steel and aluminum bottom boards.

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Telephone 2-2553 **CLAMP AND FLASK COMPANY** Richmond, Indiana

Designers of **CORE PLATES, JACKETS, BANDS, FLASKS** *since 1889*

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THE NEW LEADER...

Now . . . look to Leeco . . . the new leader in core and mold washes for steel, iron and non-ferrous foundries!

pre-tested, proven products!

Leeco products...tried, tested and proven before release...set new standards for efficiency ...out-perform any other core wash now on the market!

over 100 years' experience

Leeco offers proven products by foundrymen for foundries! The principals of Leeco Products are all veterans with a total of 117 years of experience in foundry practices.

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Leeco's spacious new plant permits utmost production efficiency. Skill and experience combined with the most modern of facilities result in products of unquestioned superiority!

P. S.

we'll see you at the convention! booth 806

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farndale 20, michigan

STEEL...LEECOTE HR 200...LEECOTE TORCH DRY • GRAY IRON...LEECOTE WHITE...LEECOTE BLACK...LEECOTE HR 222...LEECOTE WJ 270...LEECOTE NO TORCH • NON-FERROUS...LEECOTE NON-FERO CORES AND MOLDS • LEECO LIQUID PARTING • LEECO DRY CORE BINDERS

ANOTHER Herm
*ROL-O
*FULLY PATENTED

FIRST-
-CAST
The *Newest* in centrifugal casting machines now producing 100 to 120 lengths of concentric 5-foot soil pipe per hour. Completely automatic. Yield 100%.

Herman's Rol-O-Cast Produces Soil Pipe at High Rate

ROL-O-CAST combines the dual functions of mold making and centrifugal casting. It is designed to produce 2, 3, and 4 inch ID soil pipe.

Rol-O-Cast is completely automatic. Four flasks are controlled for simultaneous horizontal spinning by four variable speed electric motors. Flasks are swung 90° to a vertical position for introduction of sand and subsequent ejection of the castings. Flasks are spun horizontally at the rate of about 1000 rpm. This spinning action partially forms the molds by evenly distributing the sand; mandrels then exactly size the molds.

Centrifugal casting of the metal covers a period of about 20 seconds before solidification, after which the flasks are returned to a vertical position.

Air controlled rams are located above the machine to eject pipe and sand from the four flasks simultaneously into a pit. A power conveyor carries away the pipe and sand from the pit.

In addition to casting soil pipe, ROL-O-CAST can be modified to produce liners, bushings, cast tubing and other items of similar shape.

ROL-O-CAST is another result of Herman Pneumatic's continuing development of quality molding machines. A new and revolutionary Indexing Machine, the Herman Stationmaster, was introduced to the trade about a year ago.

Herman is world-famous for its line of Molding Machines with patented roll-over action. Available in roll-over capacities of 525 to 40,000 lbs., they are simple to operate, fast and efficient.

All Herman Molding Machines have made their way by the way they're made.

bvb

Means

building ventilation balance

Schneible Engineers now offer dust and fume control with Building Ventilation Balance.

This means balancing *ALL* foundry air . . . air supplied to and exhausted from dust collectors, pouring hoods, mold conveyors, mold cooling hoods, etc., in addition to other processed air, plant heating supply and consideration of normal building leakage. **bvb** is accomplished by means of a metered balancing air supply from both outside and inside the building.

New foundry efficiencies and operating economies are achieved through Schneible's System of Building Ventilation Balance.

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DETROIT 32, MICHIGAN

Please send me your new bulletin on bvb without obligation.

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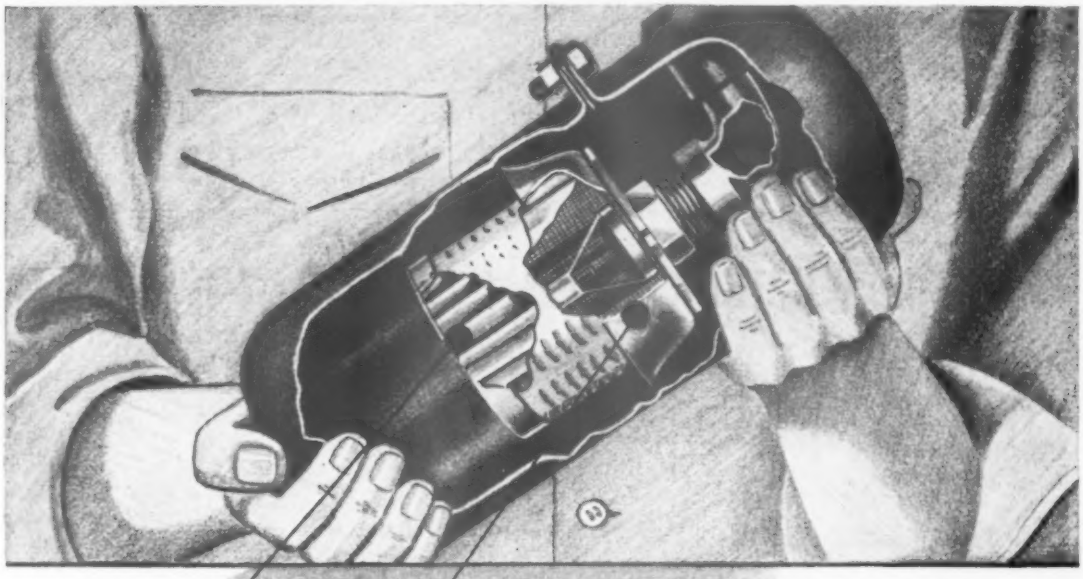
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

STAYNEW PIPE LINE FILTERS



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MOISTURE
OIL
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PIPE SCALE

from Compressed Air Lines

Tests prove that Staynew Filters often save their entire cost in just a few weeks. By preventing the passage of foreign matter, including moisture (water and oil), they prevent excess wear, costly freeze-ups, damage to materials and interference with processes.

EXCLUSIVE DOUBLE-ACTION PRINCIPLE PROVIDES:

MECHANICAL SEPARATION—Deflector Cup drives foreign matter to bottom of container where heavier particles are deposited.

FILTRATION—air or gas rises thru the original Radial Fin Insert which removes the lighter material.

DOLLINGER
PROTECTO-MOTOR
STAYNEW FILTERS

IMPORTANT APPLICATIONS: Protection of Air-operated Tools and Controls • Paint Spraying • Sand Blasting • Air Displacement or Agitation of Liquids

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ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Division, Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Extra-Low-Carbon STAINLESS STEEL

New Type Chromium-Nickel Steels Have Added Corrosion Resistance

New and improved austenitic stainless steels of the 18-8 type have been developed which have superior corrosion resistance after being exposed to heat. These steels, known as extra-low-carbon stainless steels, were designed especially for use in welded and stress-relieved equipment that is exposed to more severe corrosive conditions than are normally encountered by other types of straight 18-8 stainless steel.

Under severe corrosive conditions, intergranular attack may occur in the higher carbon unstabilized grades of austenitic stainless steels that have been subjected to the temperature range of 800 to 1600 deg. F. during welding or hot forming operations. It is generally agreed that this type of corrosion is caused by complex carbides that are formed at the grain boundaries of the stainless steel during heating.

The effect of heat is rarely harmful in the ordinary fabrication of stainless steel for most applications, such as in architecture, the food and dairy industries, in hospitals, and in the home. However, in the chemical and other allied industries, where stainless steel is used in the handling of very corrosive chemicals, these new extra-low-carbon stainless steels should most certainly find wide use.

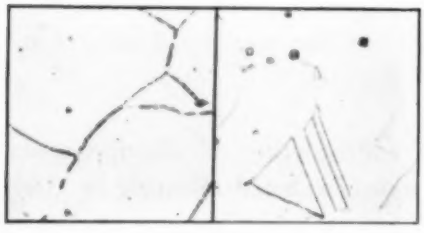


Fig. 1 Left: Carbide precipitation at the grain boundaries of an 18-8 stainless steel, containing 0.059 per cent carbon, after being held at 1200 deg. F. for 1 hour. Right: Absence of carbide precipitation in 18-8 stainless steel of 0.03 maximum carbon content, after being held at 1200 deg. F. for the same length of time.

In general, there are three ways in which the precipitation of carbides can be controlled in stainless steel:

1. Heat-treating so that the carbides present are dissolved.
2. Alloying with an element, such as columbium or titanium, that will tie up the carbon in the form of a harmless carbide.
3. Decreasing the carbon content of the steel.

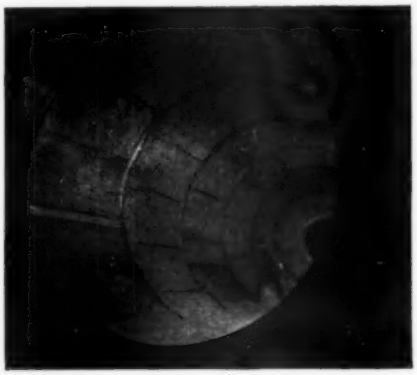


Fig. 2. The new extra-low-carbon stainless steels are especially suited for large types of process equipment, such as this fractionating tower. They require no heat-treatment after welding.

Heat-Treatment After Welding

Before the development of extra-low-carbon stainless steel, or of the "stabilized grades", one means for preventing intergranular corrosion was to heat-treat stainless steel that had been subjected to the dangerous temperature range, so that the precipitated chromium-carbides would go back into solid solution. It was found that when a welded part was heated to temperatures of 1950 to 2000 deg. F., and then cooled rapidly, most of the carbides were retained in solid solution. This extra heat-treatment is sometimes impractical, however, because of the design or massive size of some types of welded equipment.

Use of Columbium and Titanium to "Fix" Carbon

As the result of a search for a method of producing stainless steels that would be immune to intergranular corrosion without heat-treatment, the columbium- and titanium-bearing stainless steels were developed. These elements form carbides more readily than chromium. It was found that columbium, when present in a 10 to 1 ratio to carbon, completely "fixes" the carbon and renders it harmless in stainless steel. A similar effect can be accomplished by alloying with about five times as much titanium as carbon. Steels thus alloyed with columbium or titanium are known as "stabilized grades."

Decreasing Carbon Content

The most recent development in preventing intergranular corrosion has been the extra-low-carbon stainless steels. To be substantially harmless in stainless steel for as-welded or welded and stress relieved chemical equipment operating at temperatures under 700 deg. F., carbon must not be present in quantities over 0.03 per cent.

In 1937, ferrochrome with 0.03 per cent maximum carbon was first produced for the steel industry by ELECTROMET. This product has made it possible to produce very-low-carbon stainless steels—steels that are completely immune to intergranular corrosion when welded or subjected to a stress-relieving heat-treatment.

Metallurgical Service Available

If you use welded stainless steel equipment, it will pay you to investigate the advantages of using extra-low-carbon steels. If you produce stainless steel, our metallurgists will be glad to give you technical assistance in the use of ferrochrome of 0.03 per cent maximum carbon. For further information, write to the nearest ELECTROMET office.

For a more detailed account of the properties of extra-low-carbon stainless steel, write for a free copy of the technical paper, "Resistance to Sensitization of Austenitic Chromium-Nickel Steels of 0.03% Max. Carbon Content".

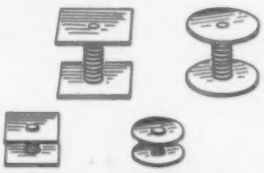
The term "Electromet" is a registered trademark of Union Carbide and Carbon Corporation.

I'll tell you Boss — our scrap rate's down and we're getting better castings FASTER with . . .

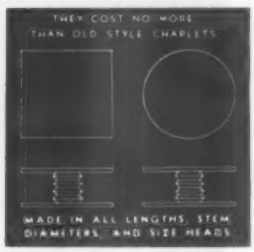
CHICAGO CHAPLETS and CHILLS

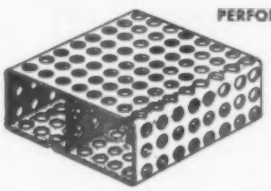
WROUGHT IRON FORGED HEAD CHAPLETS—With thread stem—plain, coppered or tinned.

FITTED HEAD STEM CHAPLETS—With thread stem—curved or flat, square or round heads—plain, coppered or tinned.

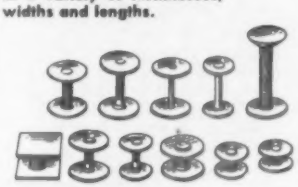


DOUBLE HEAD CHAPLETS—With thread stem—square or round plates fitted—plain, coppered or tinned.

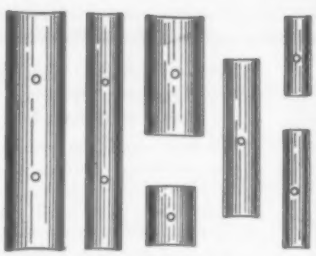




PERFORATED TIN CHAPLETS—Made in a variety of thicknesses, widths and lengths.

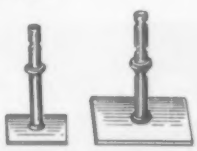


MOTOR CHAPLETS—Double round—double square—two fitted heads.



STANDARD RADIUS OR CORNER CHILLS—Obtainable in straight lengths for use on straight edged cores and filleted corners or molds. They accelerate cooling, insure sound castings free from internal shrink and surface checks and prevent molten metal from cutting into sand.

HINGE TUBES—For coring clean holes (accurate for size and location) through ribs and lugs.



RADIATOR CHAPLETS—Plain or nicked—with or without shoulder.

IT'S THE LITTLE THINGS — THAT BOOST PRODUCTION *and* PROFITS

Little things, like Chicago Chaplets, which readily fuse and make a perfect union with castings...or Chicago Chills which effectively prevent shrinkage, spongy surfaces and sand washing...because they are made right—are always uniform and dependable in size and quality—and therefore economical in the long run.

Firms throughout the country use them—*and have for over 30 years.* They know that adequate stocks and facilities are always maintained to assure prompt deliveries . . . That we will cooperate in every possible way to solve their problems and that we render the kind of service that keeps their production "on-the-move".

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For Uniform, Low Cost, Efficient Blast Cleaning

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SHOT HI-GRADE GRIT

When you buy shot and grit, you buy a promise of uniform, low cost, efficient blast cleaning or peening. Your confidence in the material ordered should be based on actual use, rather than recommendation or reputation. Its true value to you can only be determined by a thorough test in your equipment, on your job.

To all outward appearances, most shot and grit may appear to be the same—but, that's where the similarity ends. Where Hi-Grade Shot and Grit are concerned, you'll find there IS a difference . . . a value far beyond purchase price that pays out in extra performance on *your* job. Hi-Grade Shot and Grit is *quality-controlled* from molten metal to finished product. Order a trial quantity today. Let results convince you *Hi-Grade is best by test.* That's the only practical and profitable way to buy abrasives.

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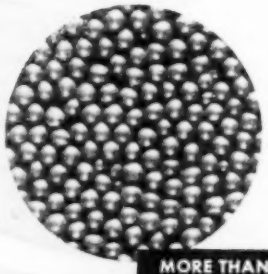
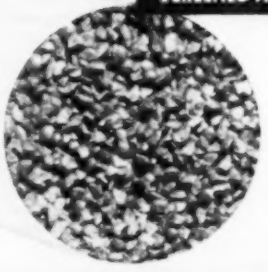
READY FOR IMMEDIATE SHIPMENT



HI-GRADE SHOT
UNIFORM SIZE AND HARDNESS

Withstands repeated strain, stress and wear. Famous for its lack of hollows, tails, irregular shapes. Exclusive alloying and tempering process helps prevent rust; minimizes impact fractures.

MORE THAN MEETS S.A.E. SPECIFICATIONS
SCREENED AND GRADED FOR 100% USAGE



HI-GRADE GRIT
SHARP, TOUGH AND DURABLE

Made of same material and processed by same methods as Hi-Grade Shot. Free from dust fines and scale. Cleans with maximum efficiency. Easy on equipment—reduces wear and maintenance costs.

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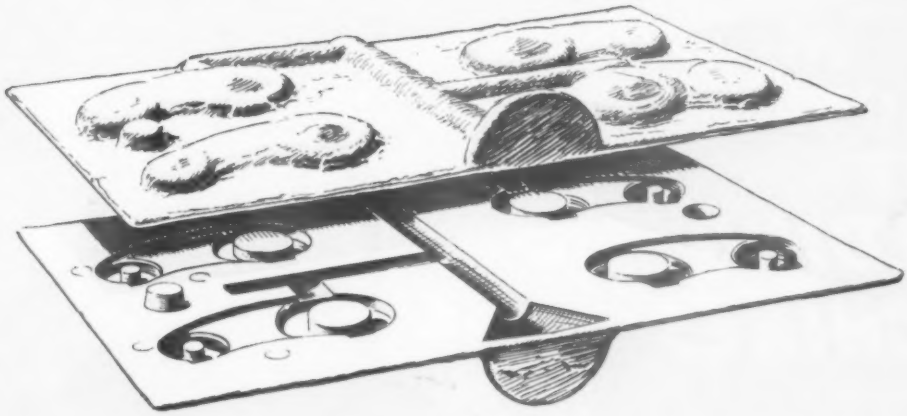


SEE THE NEW "CRONING PROCESS"

AT THE 1950 NATIONAL FOUNDRY SHOW

For the First Time In The United States, This New Method For Making Sand Molds and Cores Is Displayed Publicly At Bakelite's Exhibit, Booths 1216—1319.

OBSERVE FIRSTHAND the features of the new "Croning Process" for producing sand molds and cores, using special BAKELITE Phenolic Resins developed for the purpose. See actual demonstrations of making molds and cores by this process.

The demonstrations have been arranged through the courtesy of the Crown Casting Associates of Boston, Mass., who own U.S. patent applications directed to various aspects of the process, and grant licenses to users. You can learn much from this "action" exhibit which presents the various steps, including mold making, metal pouring, and production of finished castings.

Engineers will be present to answer your inquiries, and to provide information on the process for making sand molds and cores.

If you cannot attend this Show, it will be worth your while to write to Bakelite Division, Dept. AI-29 for your copy of a bulletin providing information on the BAKELITE Phenolic Resins suited to this new process.

Bakelite TRADE-MARK *Phenolic* BONDING RESINS

BAKELITE DIVISION UCC

BAKELITE DIVISION, *Union Carbide and Carbon Corporation*, 30 East 42nd Street, New York 17, N. Y.

HEAVY DUTY *MOLDING MACHINES*

JOLT-SQUEEZE FOR JOBBING AND PRODUCTION WORK

This Type 16-M Heavy Duty Jolt-Squeezer was designed especially for rugged foundry service. A compact, sturdy machine of simple construction insures successful operation; gives a hard solid jolt.

This machine is provided with an interlocking means which insures the head being in squeezing position before the squeeze valve can be operated. The squeeze head is operated to and from the squeezing position with ease.

The base and squeeze cylinder is a heavy, one-piece semi-steel casting. All pins and bushings are case hardened and ground to size. This machine requires a minimum of floor space.

Descriptive leaflets, giving specifications and dimensions of this, and many other Jolt-Squeeze and Pattern Draw machines, sent upon request.

TYPE 16-M
HEAVY DUTY
JOLT-SQUEEZER

Wm. H. NICHOLLS Co., Inc.

RICHMOND HILL 18, LONG ISLAND, NEW YORK

ESTABLISHED 1910

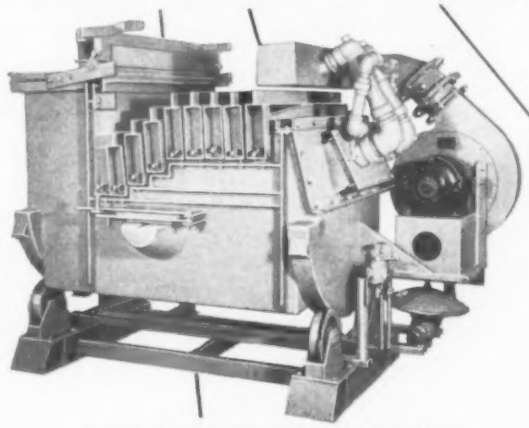
FOREIGN MANUFACTURERS AND SELLING AGENTS FOR CONTINENTAL EUROPE AND GREAT BRITAIN—GEORGE FISCHER, LTD., SCHAFFHAUSEN, SWITZERLAND

NICHOLLS

4 WAYS TO *Greater Profits*

...FASTER MELTING ...BETTER SHOP CONDITIONS!

These four leading Stroman Furnaces are merely a part of the tremendous complete line of furnaces that Stroman makes for use in Foundries, Die Casting, Permanent Mold and Sand Casting Plants. Remember . . . Stroman builds any type or size furnace for any or all size melting problems. Each type furnace does its job exceptionally well, assuring lowest fuel costs, easiest operation, fastest melting and longest life. They are the furnaces you should consider above all others, for they are the acknowledged leaders in the field. Send your melting room problems to Stroman today . . . their engineers, who are qualified experts in melting room procedure and layout, will be only too glad to consult with you and offer suggestions for improvements and savings.



ECONOMELT FURNACES

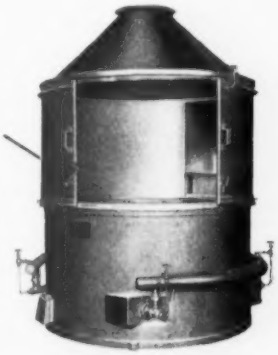
The finest direct fired reverberatory melting furnace ever offered. Melting speed for Brass, Bronze, Grey Iron or Aluminum is unmatched. Continuous charging. Cold metal does not reach the molten bath causing it to chill. All metal is preheated and melts in suspension. This furnace shows upward of 40% savings in fuel costs. Oil, gas or combination oil-gas fire. Capacities (Brass or Iron) up to 6000 lbs. Write for Bulletin 635 giving full information.

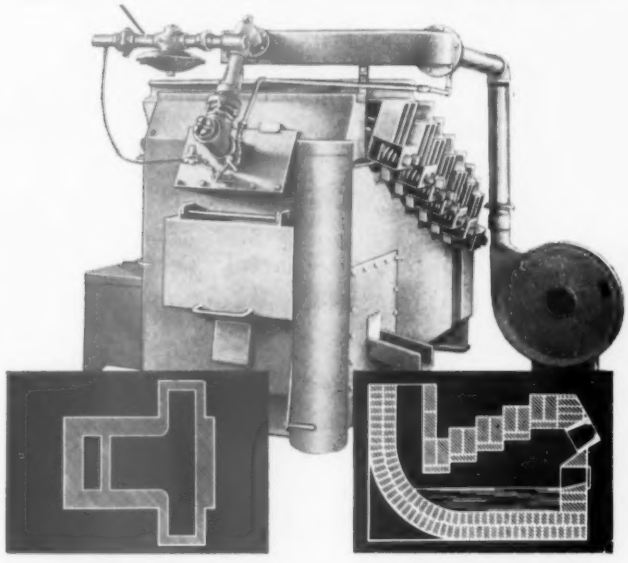
STROMAN RM STATIONARY CRUCIBLE MELTING AND HOLDING FURNACES FOR ALUMINUM

Built especially for use in permanent mold and die casting plants where molten metal is dipped from furnace with a hand ladle. Melting is done in crucible (no iron pick-up). Thoroughly insulated to protect the operator from heat. Oil, gas or combination oil-gas fire. Capacities, 200 to 800 lbs. Available with full automatic controls.

STROMAN IRON POT MELTING FURNACES FOR ZINC OR ALUMINUM

These furnaces are highly recommended as breakdown furnaces for zinc and aluminum die casting and permanent mold plants. They also excel as holding furnaces. They can be supplied either with or without hoods to exhaust fumes and heat. Their construction assures longest pot life and lowest fuel costs. Choice of automatic or manual controls and oil or gas fire. Capacities from 212 to 14,000 lbs. zinc.





Horizontal view showing 2 dip-out boxes.

Vertical view showing combustion chamber, metal bath, charging hopper and clean out door.

STROMAN MODEL MC ALUMINUM REVERBERATORY DIP-OUT FURNACE

It's New! Continuous charging and pouring make it without equal in low fuel and maintenance costs plus quality castings. Two Stromans in one . . . the combination of breakdown and holding furnaces makes this the most economical furnace ever designed for aluminum melting. It can be used for melting, holding, alloying fluxing for either casting or producing ingots. Cold metal does not reach the molten bath. Hot metal is always available for dipping. No iron pots or crucibles to buy. Bath capacities range from 500 to 10,000 lbs. Oil, gas or combination oil-gas fire.

Write for Complete Information at Once

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

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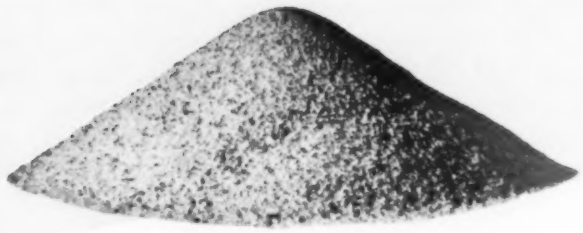
NICHOLS

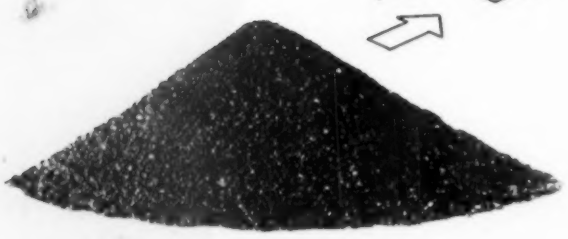
Sand Reclamation Systems

Engineered to fit the job—and budget

LOW TEMPERATURE DRYING
OR
HIGH TEMPERATURE BURNING

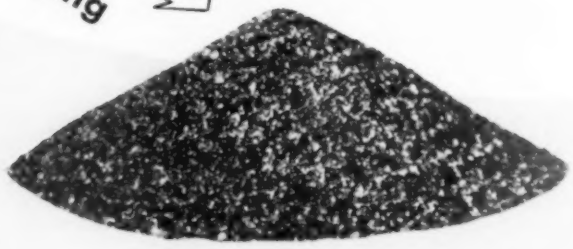


High temperature burning



The photos shown are unretouched.

Low temperature drying



Nichols Sand Reclamation Systems will meet the requirements of most foundries—

Wet scrubbing with either low temperature drying or high temperature burning.

Which system to use is largely determined by type of castings and core practices. Each system possesses definite advantages under specific conditions.

Investigate—today—sand reclamation with the Nichols Systems. A subject with great possibilities—substantial savings.

Nichols offers to interested foundries the services of a pilot plant for small scale processing and a well staffed engineering department for preliminary analysis or complete plans.

Write for Bulletin No. 222
Your inquiries are invited.

COME IN AND SEE US AT BOOTH No. 124 FOUNDRY SHOW

ENGINEERING & RESEARCH CORPORATION
70 PINE ST., NEW YORK 5, N. Y.
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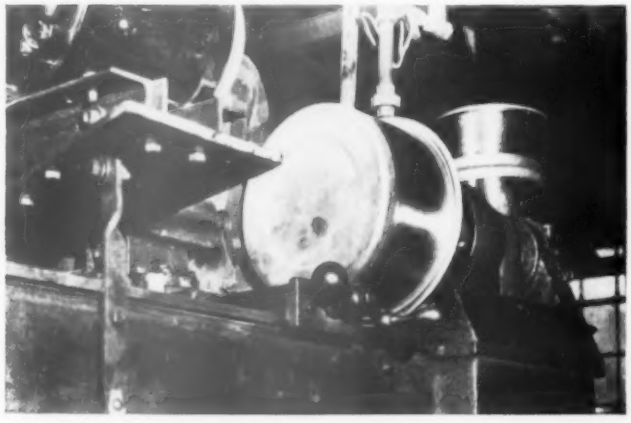
86 years' experience in bonds and abrasives enables "U. S." Engineers to eliminate all guesswork in filling your specifications

NO MATTER WHAT THE JOB, there's a U. S. Royalite Wheel to handle it. From billets to bits, slabs to saucepans, castings to ball races . . . "U. S." engineers can design and build with hairsplitting accuracy. They can give you costs in advance, too, because . . .

BY MEANS OF TESTS right in your own plant, backed by 86 years of experience, they remove all guesswork. "U. S." facilities permit complete and positive testing to make sure you get the right wheel, whether the function is unusual or routine.



IF YOUR OPERATING CONDITIONS change, "U. S." technicians can very often come up with the right answer *in a hurry*, even when it means filling specifications never before demanded in a grinding wheel.

Bring your grinding wheel problems to U. S. engineers. Let them study it, let them make tests. They will make sure you receive properly engineered wheels in which you can have complete confidence.

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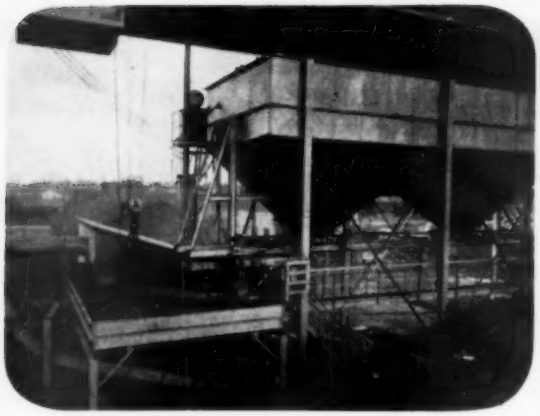
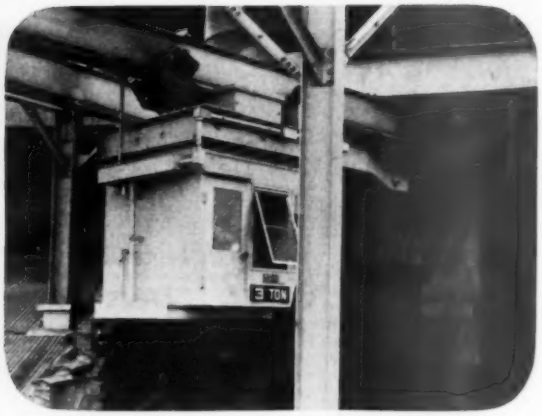
IF IT'S WHITING IT'S ENGINEERED

MAKE-UP and CHARGING

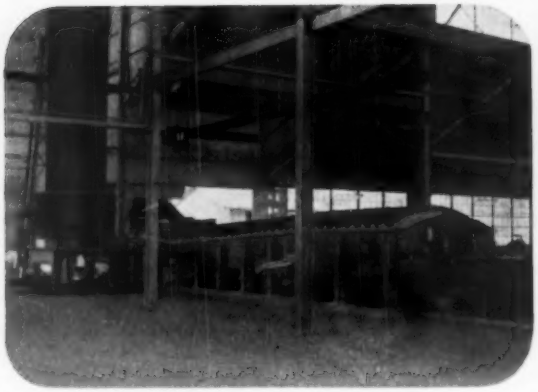


Whiting Equipment handles the charge from yard to cupola. Here a magnet crane is making up the metal charge.



Whiting Mechanical Chargers range from simple skip hoists for a single cupola, to swivel, crane, and monorail chargers.

MELTING and HOLDING



For hot metal at low cost, Whiting Duplexing is available in many combinations—above is cupola to air furnace.

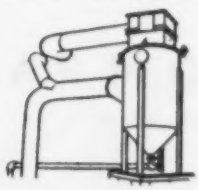
The Whiting Heated Metal Mixer provides uniform hot metal—a real boon where light, thin-section castings are poured.

WHITING Corporation

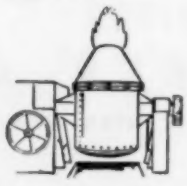
15607 Lathrop Ave. • Harvey, Illinois

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

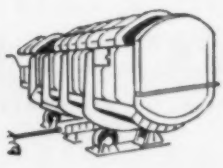
DUST SUPPRESSORS



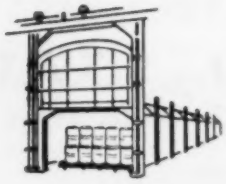
CONVERTERS



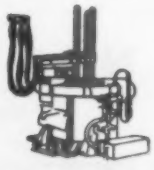
CRADLE FURNACES



ANNEALING OVENS

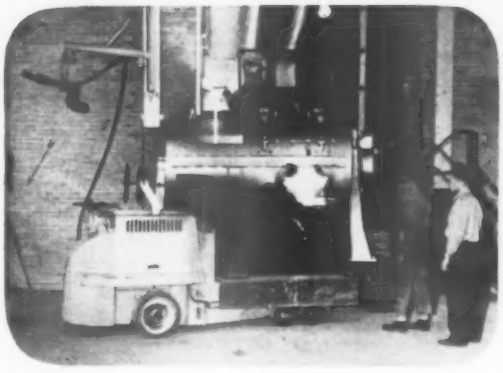


HYDRO-ARC FURNACES



BY PRACTICAL FOUNDRYMEN

DISTRIBUTION and POURING

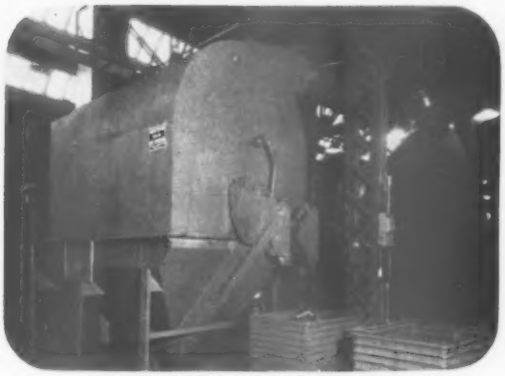


Here cupola metal flows into a Whiting Mixing Ladle from which it is poured into the distributing ladle. Whiting makes ladles for every foundry use.

Whiting Ladles, Ladle Handlers, and Pouring Systems are designed for pouring ease, safety, and long life—engineered from years of practical foundry experience.

DUST SUPPRESSION

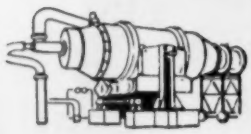
The Whiting Cupola Dust Suppressors control fly ash and sparks with water—reducing all solids to harmless sludge.



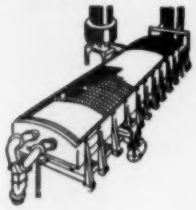
Hydro-Clone Dust Suppressors control foundry dusts at their source—at shakeouts, sand-handling systems, etc.

Send the coupon for free literature on any items of Whiting Foundry Equipment . . . or contact the nearest Whiting office if you want to talk with a sales engineer.

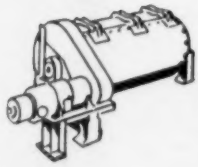
ROTARY FURNACES



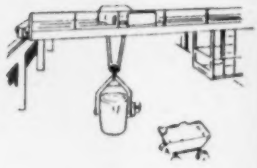
DUPLEXING SYSTEMS



TUMBLERS



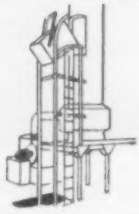
CRANES



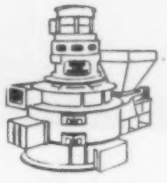
TRAMBEAM SYSTEMS

Offices in Chicago, Cincinnati, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York 7, N. Y.

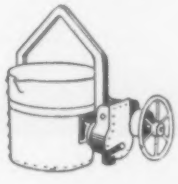
CUPOLA and CHARGER



PULVERIZERS



LADLES



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15607 Lathrop Ave., Harvey, Illinois

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☐ Cupolas	☐ Duplexing	☐ Ladles
☐ Elec. Coke Igniters	☐ Cradle Furnaces	☐ Pouring Systems
☐ Chargers	☐ Heated Metal Mixer	☐ Cranes & Hoists
☐ Skip Hoists	☐ Annealing Ovens	☐ Transfer Cars
☐ Electric Furnaces	☐ Converters	☐ Tumblers
☐ Air Furnaces	☐ Pulverizers	☐ Dust Suppressors

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Company_____

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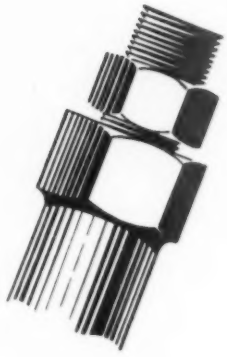
EXPERIENCED MACHINISTS INSIST..

Brass Valves Possess Great Machinability!



The free cutting characteristics of Brass are ideal in the manufacturing of all types of valves and other castings that require machining.

This outstanding quality of a Brass Casting . . . . . MACHINABILITY . . . makes it an efficient and economical friend of the machinist.

Specify- LAVIN NON-FERROUS INGOT -*Quality*

R. LAVIN & SONS, INC.

Refiners of Brass, Bronze and Aluminum

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Make Parting Easier
Cut Rejects
Reduce Foundry Smoke

USE **"dag"** dispersions in your foundry because they:

IMPROVE PARTING by preventing adhesion of cast objects to mold cavities and cores.

CUT REJECTS and finishing costs because castings are reproduced in the finest detail. Films formed by **"dag"** dispersions are smooth . . . resistant to heat . . . extremely durable, and will not measurably affect mold tolerances.

REDUCE SMOKE and give men in the shop a break, because aqueous **"dag"** dispersions do not give off clouds of smoke and choking fumes.

Spray or brush it on chills, dies, patterns, ladle interiors and permanent molds. Eliminate binding and stripping, too, by using **"dag"** colloidal graphite to lubricate push pins, shoulder screws, flask pins, or any screw threads.

Acheson Colloids is equipped to do custom disintegrating, dispersing, and stabilizing of solids in a wide variety of vehicles. If you are in need of this type of service, tell us about it. We may be able to help you.

ACHESON COLLOIDS CORPORATION
Port Huron, Michigan

☐ Send me the NEW Foundry Bulletin #425

☐ Send an Acheson engineer

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Special Blocking 50% Ferro-Silicon
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* The principle is no different today than it was a hundred years ago. In ferro-alloys you must have the right amount of the right thing at the right time. The purity and uniformity of our products enable you to get the best possible results.

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BRIQUETS
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how one $5,000 crusher installation saved $80,000

Anyway you count it, $80,000 is a lot of money . . . especially for a $5,000 installation to save over a period of three years. But, that's exactly the story behind one of the first Simplicity Ring Crushers that was installed in a large automotive foundry. During the first three years, the foundry management actually saved $80,000 in new sand purchases due to the effective job done by the Simplicity Crusher on useable sand recovery.

In another instance, also in an automotive foundry, two small Simplicity Crushers, a 2′ x 6′ and a 3′ x 8′, are making anticipated savings of $40,000 in good sand recovery, retrieved metal, and eliminating of a disposal problem.

We believe we can save you money too, with Simplicity equipment, and would appreciate the opportunity to sit down and talk over your plans and problems. There's a Simplicity sales engineer near you.

SEE OUR EXHIBIT!
AT THE
FOUNDRY SHOW
SPACE 1416

SEE the new SIMPLICITY Os-A-Veyor Type Bin Feeder and two other Os-A-Veyor Feeders and Conveyors all in actual operation handling damp foundry sand!

SEE The SIMPLICITY Shake-out mounted on Simplicity Shear Mountings and equipped with oil-lubricator.

implicity
TRADE MARK REGISTERED
ENGINEERING CO. • DURAND, MICHIGAN

Improving Machinability of GRAY IRON CASTINGS

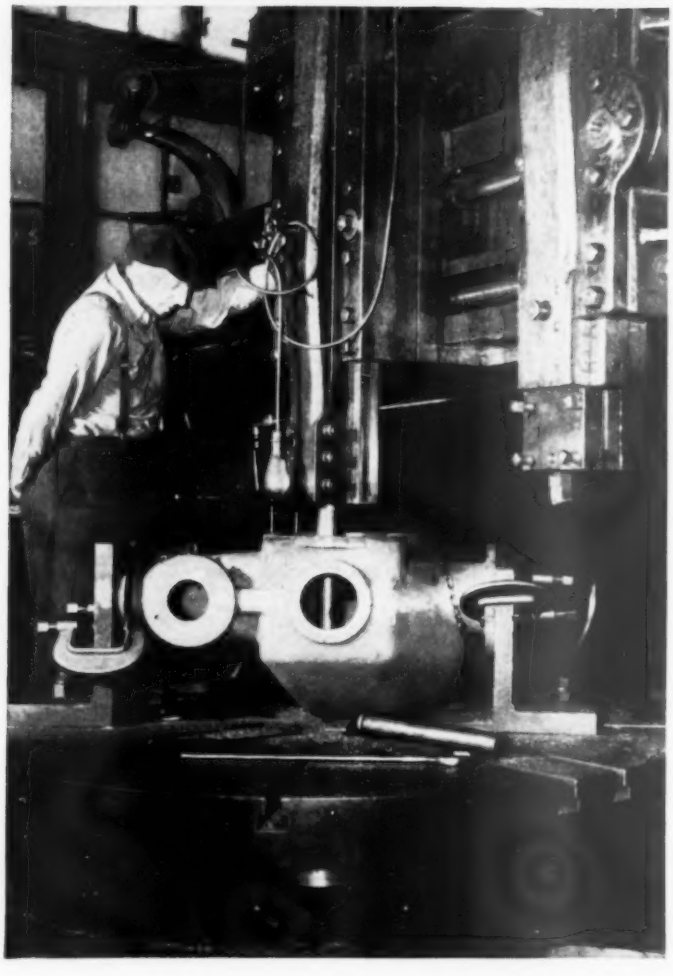
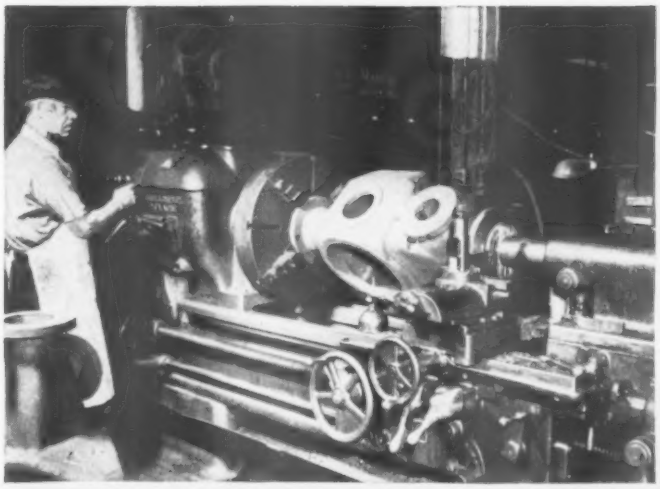
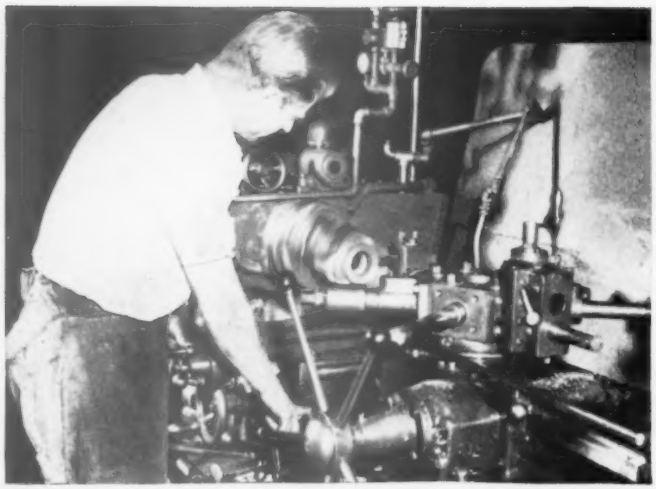


Photo Credit: Photos showing machining of castings, which have been treated with FERROCARBO Briquettes, are by the courtesy of the Rockwell Manufacturing Company, Pittsburgh, Pa. Castings were produced at Monnessen Foundry, a division of Rockwell.





3 IMPORTANT ADVANTAGES

to castings poured from iron which has been deoxidized with FERROCARBO silicon carbide Briquettes are:

1. Reduced machining time
2. Lower tool costs
3. Fewer rejected castings

The net result is realized in lower machining costs and increased profits. Complete detailed information on FERROCARBO Briquettes is easily obtainable from our metallurgical staff.

FERROCARBO Briquettes

BY CARBORUNDUM

TRADE MARK

THE CARBORUNDUM COMPANY, Bonded Products and Abrasive Grain Division, Niagara Falls, New York

FERROCARBO Distributors: KERCHNER, MARSHALL & CO., PITTSBURGH, Cleveland, Birmingham, Philadelphia and Buffalo; MILLER AND COMPANY, CHICAGO, St. Louis and Cincinnati; WILLIAMS AND WILSON, TORONTO, Montreal and Windsor.

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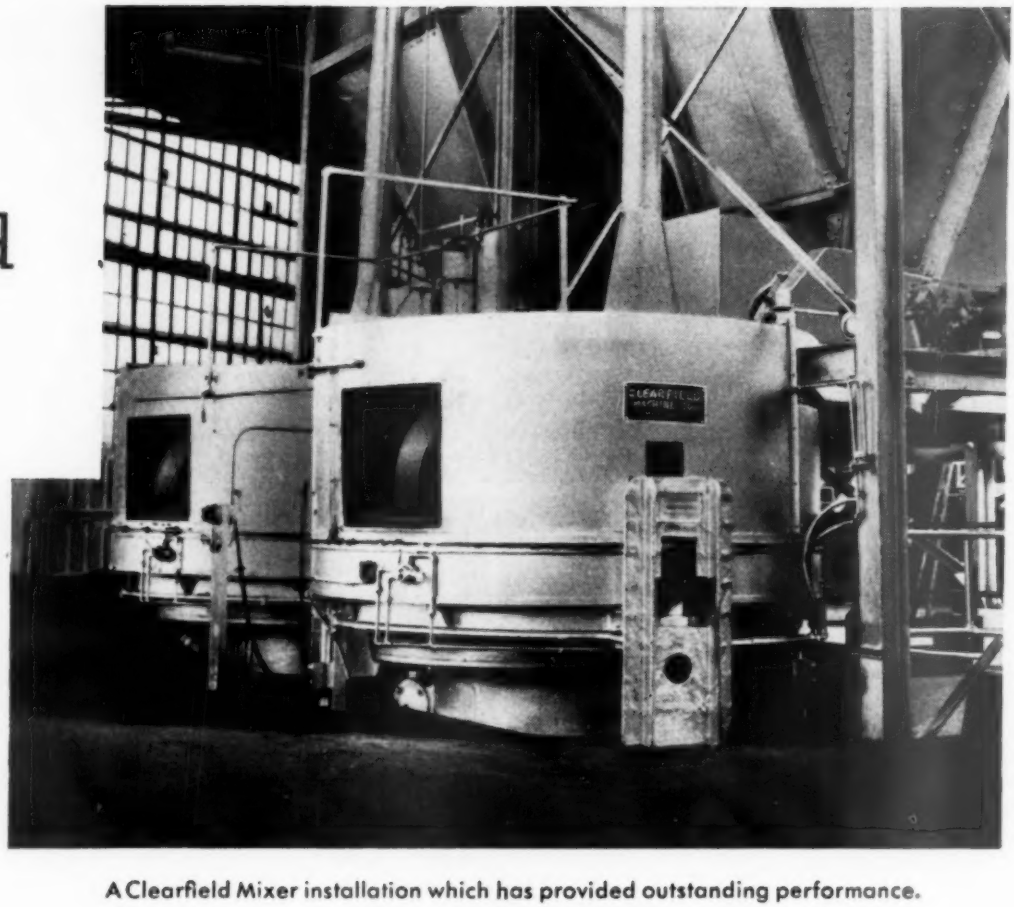
the clearfield MIXER

"perfect in every respect"



A Clearfield Mixer installation which has provided outstanding performance.

THAT'S what one of the many enthusiastic Clearfield Mixer owners told us . . . "perfect in every respect." We're very happy that the performance of our equipment brings forth such remarks.

There's a Clearfield Mixer for every need.

Clearfield Mixers, with their unique revolving pan principle and their fully automatic controls, take all the guesswork out of sand preparation. And they're available in a large range of sizes for use independently or as an integral part of a sand conditioning system. You can't go wrong with a Clearfield.

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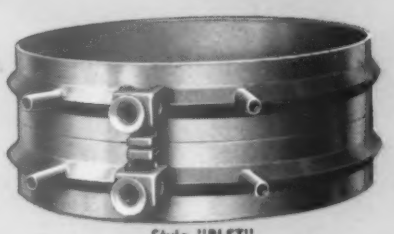
FOUNDRY SHOW—CLEVELAND, MAY 8-12

CLEARFIELD MACHINE COMPANY
CLEARFIELD
PENNSYLVANIA, U. S. A.

The Spotlight is Focused on the Dependable Line of Sterling FOUNDRY FLASKS

Style "GSX"
with Single Pin Lugs and
Two-Man Lift Handles



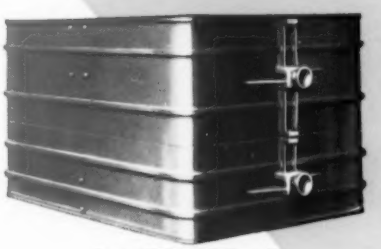
Style "BLST"
with Trunnions and
Two-Man Lift Handles

Style "AD"
with Double Pin Lugs

Style "AD"
Flask Sections
Stacked One Above Another
for Multiple Molding

Style "E"
with Pin Lugs and
Handles Combined

Style "H"
with Pin Lugs
Welded on Sides



Style "⅜ND-RT Cope"
Style "⅜NS-RT Drag"
Heavy Duty Flask
(Patent No. 1974292)

Style "LS"
with Angle Reinforcement
and Two-Man Lift Handles

Style
"⅜ND-RTX Cope"
"⅜NS-RT Drag"
with Heavy Duty Clamps
(Patent No. 1974292)

North American foundries . . . more than 4,500 of them . . . have adopted Sterling Steel Flasks for greater efficiency, longer life and more profitable foundry operation. These same foundries continue to specify Sterlings whenever more flasks are needed. That's because Sterlings have the strength and rigidity to resist distortion and to take hard, everyday punishment. Fabricated from special rolled steel channel into one solid, rigid piece, Sterling Flasks are capable of withstanding tremendous pressures. They retain their rigidity and accuracy over a long period of years. Available in a variety of styles and shapes. Write for your copy of Sterling Catalog No. 60.

**VISIT STERLING
BOOTH NO. 912
AT THE SHOW**

STERLING WHEELBARROW CO., Milwaukee 14, Wis., U. S. A.

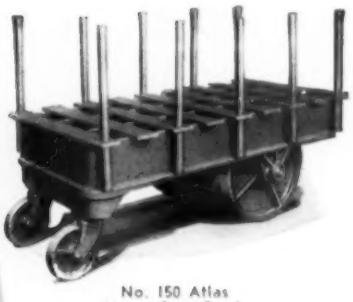
Branch Offices: **Boston · Buffalo · Chattanooga · Chicago · Cleveland · Detroit · New York · Philadelphia · St. Louis**

The Spotlight is Focused on the Dependable Line of Sterling Foundry Equipment

No. 116-A Heavy Duty Wheelbarrow

No. 50 Slag Buggy

No. 110-A Core Truck

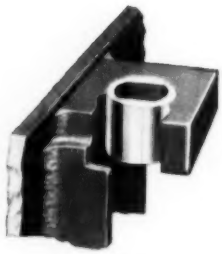


No. 150 Atlas Heavy Duty Truck

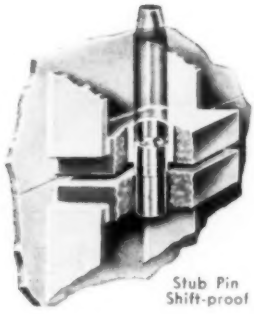
No. 160 Heavy Duty Casting Truck

No. S-5W Wheelbarrow for sand and other dry materials

Heavy Duty Cart with "3-Point" Landing



Standard Hardened Steel Bushing



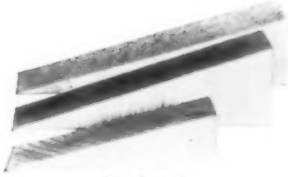
Stub Pin Shift-proof

No. 47 Casting Cart

Style X Core Plate

Sterling Flask Clamp

Standard Type "S" Flask Pin



Hardwood Foundry Wedges

In addition to Steel Flasks, Sterling offers a complete line of Flask accessories and a variety of foundry equipment. Custom-built for heavy duty foundry service and high-speed production schedules, every piece of equipment is backed by the well-known Sterling reputation for correct design and excellent workmanship. The Company has always maintained a policy of fabricating to high quality standards. Consult Sterling the next time you require foundry equipment. The Sterling branch office near you will gladly give you information and estimates — or write to factory.

VISIT STERLING BOOTH NO. 912 AT THE SHOW

STERLING WHEELBARROW CO., Milwaukee 14, Wis., U. S. A.

Branch Offices: **Boston · Buffalo · Chattanooga · Chicago · Cleveland · Detroit · New York · Philadelphia · St. Louis**

Convention Offers Ideas To Aid Foundry Progress

WITH the industry encountering intense competition in the marketing of castings, foundrymen are giving careful study to the various avenues which might provide a solution to the problem. Numerous leaders of the industry believe that the greatest opportunity for extending the demand for cast products lies in the fields of product improvement and production economies. Foundries need to employ new or improved practices, adopt controls which will maintain quality of the product from day to day, and utilize machines and materials which will reduce the man-hours required to produce a ton of castings.

Information on many of the elements needed to solve these production problems will be available to the industry at the annual convention and biennial show to be staged at Cleveland, May 8 to 12, by the American Foundrymen's Society. Between the technical sessions and the exhibits of foundry equipment and supplies, convention visitors should acquire an interesting and valuable picture of recent progress and possible future trends in the production of castings.

As may be noted on the pages that follow, the 1950 convention and exhibition promises to be one of the best in history. AFS committees and the headquarters staff have arranged a program containing many papers and committee reports covering research work sponsored by the society, other organized groups and individual foundries. In addition to the usual sessions devoted to problems of each division of the industry, the convention program this year includes joint meetings to consider features of mutual interest to several branches of the industry. Interest of management in the program of an AFS convention is being solicited through a session on management functions and controls.

The Foundry Show may produce a number of surprises. Reports from the field indicate some manufacturers of equipment and supplies will introduce recent developments in their products for the first time at Cleveland. These will include improvements in existing designs or new ideas which will attract a great amount of attention. For the first time in a number of years, an operating foundry will produce castings in the exhibition hall.

In addition to the main attractions, any convention also provides numerous side shows. At Cleveland these include an exceptional plant visitation program arranged by a committee of the Northeastern Ohio Chapter, and the annual banquet Wednesday evening which probably will attract the largest crowd in the society's history.

Foundry week in 1950 promises so much of value that progressive foundrymen cannot afford to miss participation in the program.

See you at Cleveland?

Frank G. Steinebach
Editor

AFS MEETS IN CLEVELAND

CLEVELAND, scene in the past of seven successful national conventions of the American Foundrymen's Society, again will be the rallying point for members of the foundry industry, May 8-12. Program of the 54th annual AFS Foundry Congress and Show to be held those five days indicates that the eighth meeting in Cleveland will more than match the standard of quality established by previous foundry conventions there or elsewhere.

Registration and convention headquarters will be at Cleveland's Public Auditorium, where daytime technical sessions, as well as the exhibit of foundry equipment, supplies and services, will be held. Evening meetings are scheduled for downtown hotels. Registration fees for the week are $3 for AFS members and $7 for nonmembers. Foundry workers of the Cleveland district will be admitted to the Foundry Show on Northeastern Ohio Day, Monday May 8, from 1 to 9:30 p.m. upon presentation of tickets being distributed free by foundries in co-operation with a committee of the host Northeastern Ohio Chapter. This committee is headed by John A. Sharritts, Westinghouse Electric Corp., and Leslie Schuman, National Malleable & Steel Castings Co. Registration also is not required to attend the practical shop courses scheduled for Monday, Tuesday and Thursday evenings.

Technical Sessions — Perusal of the program of technical meetings planned for the week (shown on the following six pages) reveals unusually broad coverage of the many factors affecting foundry operations. Subjects of papers to be presented range from reports on research projects involving theoretical considerations, to discussions of every-day shop practices. The Gray Iron Shop Course will cover pouring, cupola bed and cupola refractory practices. Subjects for the Sand Shop Course include core and mold blowing, core dip test and sand reclamation. The new Nonferrous Shop Course will treat melting procedures.

Sessions sponsored by the individual AFS divisions are concentrated on no more than two days in most cases. Meetings devoted to aluminum and magnesium, brass and bronze and malleable iron will be held Monday and Tuesday. Steel sessions are scheduled for Thursday and Friday, and gray iron on Wednesday, Thursday and Friday. Plant equipment, time study and foundry costs will be discussed Thursday, refractories on Wednesday, sand on Wednesday and Thursday, heat transfer, patterns and foundry education on Tuesday.

Nodular iron, a subject which attracted a record attendance to a meeting devoted to it at the 1949 Congress, will be covered by four papers at Cleveland. These papers comprise the program for two joint sessions of the Gray Iron and Malleable Divisions—one at 10 a.m. Wednesday, the other at 2 p.m. Friday. Another joint session—Gray Iron and Steel Divisions—will have gating and risering as its subject at 4 p.m. Friday.

"Fluid Flow in Transparent Molds," a motion picture which also drew considerable attention at St. Louis a year ago and at showings before AFS chapters the past year, is the title of a further progress report to be presented by the Aluminum and Magnesium Division at its opening session Monday morning. Work on this research project is being conducted at Battelle Memorial Institute, Columbus, O., under sponsorship of the division.

The annual exchange paper from the Institute of British Foundrymen has been prepared this year by Frank Hudson, Mond Nickel Co., London, the title being "Aluminum Alloy Castings — a Review of British Achievement."

Convention Section

Roundtable luncheons are scheduled by the various divisions the first four days of the week. Aluminum and Magnesium meets Monday noon, Malleable on Tuesday, Gray Iron and Patterns on Wednesday and Steel on Thursday.

Foundry educational subjects will be covered extensively by a roundtable discussion of high school and trade school training, and by two papers at a dinner meeting to be devoted to foundry apprentice training and to summer foundry work for the engineering student.

Dinner Meetings — In (*Please turn to page* 163)

Convention Section

CONVENTION PROGRAM

(All time shown is Eastern Daylight Saving Time)

Monday, May 8

10 a.m.—Registration begins. Exhibits open.

10 a.m. (A)—Aluminum and Magnesium Session
(Sponsored by Aluminum and Magnesium Division)

Presiding—R. F. Thomson, International Nickel Co., Detroit. Co-chairman—C. E. Nelson, Dow Chemical Co., Midland, Mich.

Fluid Flow in Transparent Molds—progress report and motion picture, Aluminum and Magnesium Research Project—L. W. Eastwood, Battelle Memorial Institute, Columbus, O.

10 a.m. (B)—Brass and Bronze Session
(Sponsored by Brass and Bronze Division)

Presiding—J. J. Curran, Walworth Co., Greensburg, Pa. Co-chairman—A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee.

An Investigation of Melting and Casting Procedures for High Purity Nickel—D. W. Grobecker, Los Alamos Scientific Laboratory, Los Alamos, N. M.

Metal Melting—Application of Thermodynamic Principles to Melting Nonferrous Metals—R. I. Moore, Wilson Brass & Aluminum Foundry Co., Toronto, Ont., Canada.

10 a.m. (C)—Malleable Session
(Sponsored by Malleable Division)

Presiding—H. C. Stone, Belle City Malleable Iron Co., Racine, Wis. Co-chairman—E. Roby, Jr., Peoria Malleable Casting Co., Peoria, Ill.

Some Effects of Deoxidizing Additions on Malleable Irons—Richard W. Heine, University of Wisconsin, Madison.

Subcritical Isothermal Graphitization — Harry A. Schwartz, National Malleable & Steel Castings Co., Cleveland.

12 Noon—Aluminum and Magnesium Roundtable Luncheon
(Sponsored by Aluminum and Magnesium Division)

Presiding—Walter Bonsack, Christiansen Corp., Chicago. Co-chairman—Harold J. Rowe, Aluminum Co. of America, Pittsburgh.

Subject: *Test Bar Gating.*

1 p.m. to 9:30 p.m.—Northeastern Ohio Day—Free admission for local plant men.

2 p.m. (A)—Brass and Bronze Session
(Sponsored by Brass and Bronze Division)

Presiding—George J. Barker, University of Wisconsin, Madison. Co-chairman—Harold J. Roast, consultant, Westmont, Que.

Effect of Superheat and Casting Temperature on Properties of Tin Bronze—B. N. Ames and N. A. Kahn, New York Naval Shipyard, Brooklyn.

Melt Quality and Fracture Characteristics of 85-5-5-5—progress report, Brass and Bronze Division Research Project—F. B. Rote, University of Michigan, Ann Arbor.

2 p.m. (B)—Malleable Session
(Sponsored by Malleable Division)

Presiding—Fred W. Jacobs, Lake City Malleable Inc., Ashtabula, O. Co-chairman—R. P. Schauss, Illinois Clay Products Co., Chicago.

Furnace Atmosphere for Malleable Annealing—W. D. McMillan, International Harvester Co., Chicago.

Surface Hardening of Pearlitic Malleable Iron—AFS—sponsored research project—S. H. Bush, W. P. Wood and F. B. Rote, University of Michigan, Ann Arbor.

2 p.m. (C)—Precision Investment Casting Session
(Sponsored by Precision Investment Casting Committee)

Presiding—L. E. Grubb, International Nickel Co., Bayonne, N. J. Co-chairman—T. E. Moore, Ransom & Randolph Co., Toledo.

Casting Aluminum in Moist Investment Molds—S. Lipson and H. Rosenthal, Frankford Arsenal, Philadelphia.

Pattern Materials and Production in Precision Investment Casting—E. I. Valyi, A.R.D. Corp., New York.

4 p.m. (A)—Aluminum and Magnesium Session
(Sponsored by Aluminum and Magnesium Division)

Presiding—M. E. Brooks, Dow Chemical Co., Bay City, Mich. Co-chairman—E. J. Vargo, Wellman Bronze & Aluminum Co., Cleveland.

Magnesium Foundry Practice in Canada—M. W. Martinson and J. W. Meier, Bureau of Mines, Ottawa, Canada.

Equipment for Degassing Magnesium Alloy Melts—A. J. Juroff, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind.

6:30 p.m.—Nonferrous (Son-Father) Dinner
(Sponsored by Nonferrous Founders' Society)

7 p.m.—Chapter Officers and Directors Dinner

Presiding—Edwin W. Horlebein, president, AFS.

Speaker: Ralph L. Lee, General Motors Corp., Detroit.

8 p.m. (A)—Gray Iron Shop Course
(Sponsored by Gray Iron Shop Course Committee)

Presiding—K. H. Priestley, Vassar Electroloy Products Inc., Vassar, Mich. Co-chairman—E. J. Burke, Hanna Furnace Corp., Buffalo, N. Y.

Subject: *Pouring Practice for Gray Iron.* Discussion leader—E. W. Deutschlander, Worthington Pump Co., Buffalo.

8 p.m. (B)—Nonferrous Shop Course
(Sponsored by Brass and Bronze Division)

Presiding—J. L. Stroman, Stroman Furnace & Engineering Co., Franklin Park, Ill.

Subject: *Fuel Melting.* Discussion leader—M. G. Dietl, Crane Co., Chicago.

8 p.m. (C)—Sand Shop Course
(Sponsored by Sand Shop Course Committee)

Presiding—F. S. Brewster, Harry W. Dietert Co., Detroit. Co-chairman—E. L. Thomas, Packard Motor Car Co., Detroit.

Subject: *Core and Mold Blowing.* Discussion panel—A. E. Czechowicz, the Key Co., E. St. Louis, Ill.; R. W. Gardner, Ford Motor Co., Dearborn, Mich.; L. D. Pridmore, International Molding Machine Co., LaGrange Park, Ill.

9:30 p.m.—Exhibits close.

Tuesday, May 9

9 a.m.—Registration and exhibits open.

10 a.m. (A)—Aluminum and Magnesium Session
(Sponsored by Aluminum and Magnesium Division)

Presiding—R. E. Ward, Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J. Co-chairman—W. E. Carver, Light Metals Inc., Indianapolis.

New Aluminum-Zinc-Magnesium-Copper Casting Alloys—Walter E. Sicha and H. Y. Hunsicker, Aluminum Co. of America, Cleveland.

Corrosion and Stress-Corrosion Properties of a High Strength Aluminum-Zinc-Magnesium-Copper Casting Alloy—R. A. Quadt and E. C. Reichard, Federated Metals Division, American Smelting and Refining Co., Barber, N. J.

10 a.m. (B)—Brass and Bronze Session
(Sponsored by Brass and Bronze Division)

Presiding—William Romanoff, H. Kramer & Co., Chicago. Co-chairman—G. K. Eggleston, Barnes Mfg. Co., Mansfield, O.

Metal Specifications for Brass and Bronze Foundry—J. G. Dick, Canadian Bronze Co. Ltd., Montreal, Canada.

Aluminum Additions in Commercial Yellow Brass—R. A. Colton and R. H. Gilbert, American Smelting & Refining Co., Barber, N. J.

10 a.m. (C)—Heat Transfer Session
(Sponsored by Heat Transfer Committee)

Presiding—Harry A. Schwartz, National Malleable & Steel Castings Co., Cleveland. Co-chairman—E. C. Troy, National Engineering Co., Palmyra, N. J.

Solidification of Ingots—B. H. Alexander, Sylvania Electric Products Inc., Bayside, L. I., N. Y.

Influence of Dry Sand Conductivity on Rate of Freezing of Steel Slabs—progress report, Heat Transfer Research Project, Victor Paschkis, Columbia University, New York.

10 a.m. (D)—Malleable Session
(Sponsored by Malleable Division)

Presiding—H. Hunt, Auto Specialties Mfg. Co., St. Joseph, Mich. Co-chairman—F. Wurscher, Marion Malleable Iron Co., Marion, Ind.

Inspection of Pearlitic Malleable Castings—D. T. Martin, Saginaw Malleable Iron Plant, Central Foundry Division, General Motors, Saginaw, Mich.

Quantitative Correlation of Factors Influencing Annealing—Richard Schneidewind, University of Michigan, Ann Arbor.

12 Noon (A)—Brass and Bronze Roundtable Luncheon
(Sponsored by Brass and Bronze Division)

Presiding—B. A. Miller, Baldwin Locomotive Works, Philadelphia. Co-chairman—H. L. Smith, Federated Metals Division, American Smelting & Refining Co., Pittsburgh.

Subject: *Casting Defects.* Discussion leader—Howard F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.

12 Noon (B)—Malleable Roundtable Luncheon
(Sponsored by Malleable Division)

Presiding—James H. Lansing, Malleable Founders' Society, Cleveland. Co-chairman—C. F. Lauenstein, Link-Belt Co., Indianapolis.

Subjects: (1) *Effect of Excessive Oxidation in Duplex Melting,* (2) *Design of Dies for Straightening.* Discussion panel—Milton Tilley, National Malleable & Steel Castings Co., Cleveland; H. C. Stone, Belle City Malleable Iron Co., Racine, Wis.; H. G. Sieggreen, Central Foundry Division, General Motors Corp., Saginaw, Mich.; K. L. Sanders, Albion Malleable Iron Co., Albion, Mich.

2 p.m. (A)—Aluminum and Magnesium Session
(Sponsored by Aluminum and Magnesium Division)

Presiding—S. C. Massari, American Foundrymen's Society, Chicago. Co-chairman—Hiram Brown, Solar Aircraft Co., Des Moines, Iowa.

Aluminum Alloy Castings—a Review of British Achievement—Frank Hudson, Mond Nickel Co., London, England. Official exchange paper from Institute of British Foundrymen.

2 p.m. (B)—Sand Session
(Sponsored by Sand Division)

Presiding—H. K. Salzberg, the Borden Co., Bainbridge, N. Y. Co-chairman—Earl E. Woodliff, Foundry Sand Service Engineering Co., Detroit.

Treatment of Bond Clays for Foundry Sand—A. E. Pavlish (formerly with Battelle Memorial Institute, Columbus), Kelly Island Lime and Transport Co., Cleveland—(To be presented by H. W. Lownie Jr., Battelle Memorial Institute, Columbus).

Phenolic Resin Core Binders—Effect of Core Mix on Physical Properties—J. E. McMillan and J. A. Wickett, Monsanto Chemical Co., Springfield, Mass.

4 p.m. (A)—Aluminum and Magnesium Session
(Sponsored by Aluminum and Magnesium Division)

Presiding—R. T. Wood, American Magnesium Corp., Cleveland. Co-chairman—J. C. McDonald, the Dow Chemical Co., Midland, Mich.

Casting of Magnesium-Rare Earth-Zirconium Alloys in Sand—K. E. Nelson and F. P. Strieter, the Dow Chemical Co., Midland, Mich.

Development of High-Strength Magnesium Casting Alloy ZK61—J. W. Meier and M. W. Martinson, Bureau of Mines, Ottawa, Canada.

4 p.m. (B)—Educational Session
(Sponsored by Educational Division)

Presiding—A. W. Gregg, Whiting Corp., Harvey, Ill. Co-chairman—W. H. Ruten, Brooklyn Polytechnic Institute, Brooklyn.

Roundtable discussion: *High School and Trade School Training.* Discussion panel—W. J. MacNeill, Dayton Malleable Iron Co., Dayton, O.; James H. Smith, Central Foundry Division, Saginaw, Mich.; Peter E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, O.

4 p.m. (C)—Pattern Session
(Sponsored by Pattern Division)

Presiding—J. Mathias, Accurate Matchplate Co., Chicago. Co-chairman—A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee.

Making Pressure Cast Aluminum Match Plates in Plaster Molds—K. A. Miericke, Baroid Sales Division, National Lead Co., Chicago.

Production Patterns and the Matchplate—R. F. Dalton, U. S. Gypsum Co., Chicago.

Cold Formed Flexible Precision Patterns and Core Boxes—J. E. Wiss and R. B. Wagner, Perma-Flex Mold Co., Columbus, O.

4:30 p.m.—International Reception

5:30 p.m.—Registration and exhibits close

7 p.m. (A)—Canadian Dinner. Presiding—E. N. Delahunt, Warden King Ltd., Montreal. Co-chairman—J. J. McFadyen, Galt Malleable Iron Co., Galt, Ont.

7 p.m. (B)—Educational Dinner
(Sponsored by Educational Division)

Presiding—Ben D. Claffey, Acme Aluminum Alloys Inc., Dayton, O. Co-chairman—George K. Dreher, Foundry Educational Foundation, Cleveland.

Foundry Apprentice Training at Caterpillar Tractor Co.—Frank W. Shipley and B. L. Bevis, Caterpillar Tractor Co., Peoria, Ill.

The Engineering Student and Summer Foundry Work—N. J. Stickney, University of Wisconsin, Madison.

8 p.m. (A)—Gray Iron Shop Course
(Sponsored by Gray Iron Shop Course Committee)

Presiding—E. J. Burke, Hanna Furnace Corp., Buffalo.

Subject: *Cupola Bed Practice.* Discussion leader—B. P. Mulcahy, Fuel Research Laboratory Inc., Indianapolis.

8 p.m. (B)—Nonferrous Shop Course
(Sponsored by Brass and Bronze Division)

Presiding—Bruce W. Schafer, Kuhlman Electric Co., Bay City, Mich. Subject: *Electric Furnace Melting.* Discussion leader—M. G. Dietl, Crane Co., Chicago.

8 p.m. (C)—Sand Shop Course
(Sponsored by Sand Shop Course Committee)

Presiding—Earl J. Bush, U. S. Naval Gun Factory, Washington. Co-chairman—R. H. Olmstead, Whitehead Bros. Co., New York. Subject: *Core Dip Test.* Discussion leader—John B. Caine, Consultant, Wyoming, O.

Wednesday, May 10

8 a.m.—National Castings Council Breakfast

9 a.m.—Registration and Exhibits open

10 a.m. (A)—Joint Gray Iron and Malleable Session
(Sponsored by Gray Iron and Malleable Divisions)

Presiding—H. Bornstein, Deere & Co., Moline, Ill. Co-chairman—Thomas E. Eagan, Cooper-Bessemer Corp., Grove City, Pa.

Problems in Producing Ductile Iron—Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.

An Introduction to the Annealing of Nodular Iron—J. E. Rehder, Bureau of Mines, Ottawa, Canada.

10 a.m. (B)—Refractories Session
(Sponsored by Refractories Committee)

Presiding—Arthur S. Klopf, Western Foundry Co., Chicago. Co-chairman—Richard H. Stone, Vesuvius Crucible Co., Pittsburgh.

Refractory Practice in Melting Acid Electric Steel—R. H. Jacoby and M. Petty, the Key Co., East St. Louis, Ill.

10 a.m. (C)—Sand Session
(Sponsored by Sand Division)

Presiding—C. B. Jenni, General Steel Castings Corp., Eddystone, Pa. Co-chairman—J. H. Lowe, Wehr Steel Co., Milwaukee.

Reproducibility of Foundry Sand Tests—Bradley H. Booth, Carpenter Bros. Inc., Milwaukee; P. C. Rosenthal, University of Wisconsin, Madison, and H. W. Dietert, Harry W. Dietert Co., Detroit.

Tenth Annual Report on Investigation of Properties of Steel Sands at Elevated Temperatures—R. G. Thorpe and Peter E. Kyle, Cornell University, Ithaca, N. Y.

10 a.m. (D)—Steel Session
(Sponsored by Steel Division)

Presiding—C. W. Briggs, Steel Founders' Society of America, Cleveland. Co-chairman—Richard E. Kerr, Pettibone-Mulliken Corp., Chicago.

Nature of Mold Cavity Gases—Charles Locke, Armour Research Foundation, Chicago.

Metal Penetrations in Steel Sand—S. L. Gertsman, Bureau of Mines, Ottawa, Canada.

Thermodynamic Study of Pinhole Formations in Steel Castings—Howard F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass. and R. E. Savage, International Nickel Co., New York.

12 Noon (A)—Gray Iron Roundtable Luncheon
(Sponsored by Gray Iron Division)

Presiding—F. S. Brewster, Harry W. Dietert Co., Detroit. Co-chairman—R. A. Clark, Electro Metallurgical Division, Union Carbide & Carbon Co., Chicago.

Subject: *The Effect of Mold Materials on Metal Shrinkage.* Discussion leaders—Charles C. Sigerfoos, Michigan State College, E. Lansing; Clyde A. Sanders, American Colloid Co., Chicago; W. F. Bohm, Buick Motor Division, Flint, Mich.

12 Noon (B)—Pattern Roundtable Luncheon
(Sponsored by Pattern Division)

Presiding—G. Garvey, City Pattern & Foundry Co., South Bend, Ind. Co-chairman—H. C. Swanson, Arrow Pattern & Foundry Co., Chicago.

Subject: *An Alloy Designed for Pattern Shops.* Discussion leader—S. Zukor, S. Greenfield Co., Buffalo.

3 p.m.—Exhibits close

3 p.m.—Annual Business Meeting

Presiding—Edwin W. Horlebein, AFS president.
President's Annual Address
Apprentice Contest Awards
Election of Officers and Directors

4 p.m.—Charles Edgar Hoyt Annual Lecture

Operation of the Cupola—W. W. Levi, Lynchburg Foundry Co., Lynchburg, Va.

7 p.m.—Annual Banquet, Hotel Statler

Presiding—Edwin W. Horlebein, AFS president.

Presentation of Gold Medal Awards and Honorary Life Memberships.

Speaker—Leonard E. Read, president, Foundation for Economic Education, Irvington-on-the-Hudson, N. Y. Subject: *Students of Liberty.*

Thursday, May 11

8 a.m.—AFS Past-Presidents' Breakfast

9 a.m.—Registration and Exhibits open

10 a.m. (A)—Gray Iron Session
(Sponsored by Gray Iron Division)

Presiding—A. P. Gagnebin, International Nickel Co., Bayonne, N. J. Co-chairman—W. B. McFerrin, Haynes Stellite Division, Kokomo, Ind.

Improved Test Bars for Standard and Ductile Grades of Cast Iron—Richard A. Flinn and R. W. Kraft, American Brake Shoe Co., Mahwah, N. J.

Report of Cupola Research Committee—R. G. McElwee, Vanadium Corp. of America, Detroit.

10 a.m. (B)—Management Functions and Controls Session
(Jointly Sponsored by Foundry Cost Committee and Timestudy and Methods Committee)

Presiding—Ralph L. Lee, Grede Foundries Inc., Milwaukee. Co-chairman—Victor E. Zang, Unitcast Corp., Toledo.

Administration of Wage Incentives—C. T. Hassell, Lester B. Knight & Associates, Chicago.

Organizing Management for Profit—W. E. George, Booz, Allen & Hamilton, Chicago.

10 a.m. (C)—Sand Session
(Sponsored by Sand Division)

Presiding—Bradley H. Booth, Carpenter Bros. Inc., Milwaukee. Co-chairman—J. O. Oehsner, Crouse-Hinds Co., Syracuse, N. Y.

Flowability of Molding Sands—W. H. Moore, Meehanite Metals Corp., South Euclid, O.

Factors Affecting Molding Sand Density, Shrinkage and Workability—R. P. Schauss, R. F. Baley, Illinois Clay Products Co., Chicago, and Earl E. Woodliff, Foundry Sand Service Engineering Co., Detroit.

10 a.m. (D)—Steel Session
(Sponsored by Steel Division)

Presiding—R. C. Wood, Minneapolis Electric Steel Castings Co., Minneapolis. Co-chairman—David C. Zuege, Sivyer Steel Casting Co., Milwaukee.

Influence of Temperature on Fluidity and Surface Appearance of Steel Castings—G. A. Lillieqvist, American Steel Foundries, East Chicago, Ind.

Steel Quality as Related to Test Bar Fractures—H. H. Johnson and C. A. Fisher, National Malleable & Steel Castings Co., Sharon, Pa.

12 Noon—Steel Roundtable Luncheon
(Sponsored by Steel Division)

Presiding—Victor E. Zang, Unitcast Corp., Toledo. Co-chairman—Richard E. Kerr, Pettibone Mulliken Corp., Chicago.

Subjects: (1) *Fluidity Tests in Relation to Temperature and Temperature Control.* (2) *Steel Temperature Measurement.* (3) *Casting Surface Finish and Defects.*

2 p.m. (A)—Gray Iron Session
(Sponsored by Gray Iron Division)

Presiding—A. E. Schuh, United States Pipe & Foundry Co., Burlington, N. J. Co-chairman—Charles O. Burgess, Gray Iron Founders' Society, Cleveland.

Composition and Properties of Gray Iron—Richard Schneidewind, University of Michigan, Ann Arbor, and R. G. McElwee, Vanadium Corporation of America, Detroit.

Basic Lined Cupola—S. F. Carter, American Cast Iron Pipe Co., Birmingham.

2 p.m. (B)—Sand Session
(Sponsored by Sand Division)

Presiding—J. A. Rassenfoss, American Steel Foundries, East Chicago, Ind. Co-chairman—Peter E. Kyle, Cornell University, Ithaca, N. Y.

A Study of the Effect of Various Binders and Additives on the Hot Strength of Molding Sands—R. E. Morey and C. G. Ackerlind, Naval Research Laboratory, Office of Naval Research, Washington.

Effect of Moisture on Core Sand Mixtures—O. J. Myers, Werner G. Smith Co., Minneapolis.

2 p.m. (C)—Time Study and Methods Session
(Sponsored by Time Study and Methods Committee)

Presiding—E. G. Tetzlaff, Pelton Steel Casting Co., Milwaukee. Co-chairman—M. T. Sell, Sterling Foundry Co., Wellington, O.

Standard Data for Bench Coremaking—R. H. Williams, Williams Management Engineering Co., Milwaukee.

Fatigue Data Survey—M. E. Annich, American Brake Shoe Co., Mahwah, N. J.

4 p.m. (A)—Foundry Cost Session
(Sponsored by Foundry Cost Committee)

Presiding—Ralph L. Lee, Grede Foundries Inc., Milwaukee. Co-chairman—George Tisdale, Zenith Foundry Co., Milwaukee.

Management Views Costs—John A. Wagner, Wagner Malleable Iron Co., Decatur, Ill.

4 p.m. (B)—Plant and Plant Equipment Session
(Sponsored by Plant and Plant Equipment Committee)

Presiding—James Thomson, Continental Foundry & Machine Co., East Chicago, Ind. Co-chairman—R. J. Wolf, Stone & Webster Engineering Corp., Boston.

Oxygen Cutting Processes in Steel Foundries—R. Babcock, the Linde Air Products Co., Development Division, Newark, N. J.

Bandsawing in Foundries—G. H. Sheppard, the DoAll Co., Des Plaines, Ill. (To be presented by M. R. Han-

son, The DoAll Cleveland Co., Cleveland.)

Selection and Application of Cleaning Equipment—S. F. Krzeszewski, American Wheelabrator & Equipment Corp., Mishawaka, Ind.

4 p.m. (C)—Joint Sand and Steel Symposium
(Jointly Sponsored by Sand and Steel Divisions)

Presiding—Charles Locke, Armour Research Foundation, Chicago. Co-chairman—C. B. Jenni, General Steel Castings Corp., Eddystone, Pa.

Subject: *Interpretation of Sand Tests as Related to Steel Castings.* Introduction—E. C. Troy, National Engineering Co., Palmyra, N. J.

Room Temperature Testing—J. H. Lowe, Wehr Steel Co., Milwaukee, W. J. Downey, Burnside Steel Foundry Co., Chicago.

High Temperature Testing—Peter E. Kyle, Cornell University, Ithaca, N. Y.; R. H. Jacoby, the Key Co., E. St. Louis, Ill.; H. W. Meyer, General Steel Castings Corp., Granite City, Ill.; J. A. Rassenfoss, American Steel Foundries, East Chicago, Ind., John B. Caine, Wyoming, O.

5:30 p.m.—Registration and Exhibits close

7 p.m.—AFS Alumni Dinner (by invitation only)—Cleveland Athletic Club

8 p.m. (A)—Gray Iron Shop Course
(Sponsored by Gray Iron Division)

Presiding—Howard H. Wilder, Foundry Division, Eaton Mfg. Co., Vassar, Mich. Co-chairman—E. J. Burke, Hanna Furnace Corp., Buffalo, N. Y.

Subject: *Cupola Refractory Practice.* Discussion panel—E. J. Lally, Forest City Foundries Co., Cleveland, T. Giszczak, research metallurgist, AFS, Detroit.

8 p.m. (B)—Plant and Plant Equipment Session
(Sponsored by Plant and Plant Equipment Committee)

Presiding—James Thomson, Continental Foundry & Machine Co., East Chicago, Ind. Co-chairman—Harold W. Johnson, Wells Mfg. Co., Skokie, Ill.

Foundry Cleaning Room Abrasive Operations—B. H. Work, the Carborundum Co., Niagara Falls, N. Y.

Salvage of Castings by Welding of Defects—G. E. Bellew, Air Reduction Sales Co., New York.

Use of Portable Air Tools in Foundry Cleaning Rooms—A. G. Ringer, Ingersoll-Rand Co., New York.

Material Transport in the Cleaning Room—N. L. Smith, Link-Belt Co., New York, and R. J. Wolf, Stone & Webster Engineering Corp., Boston.

8 p.m. (C)—Sand Shop Course
(Sponsored by Sand Shop Course Committee)

Presiding—R. H. Jacoby, the Key Co., East St. Louis, Ill. Co-chairman—H. W. Meyer, the General Steel Castings Corp., Granite City, Ill.

Subject: *Sand Reclamation.* Discussion leader—G. H. Curtis, Nichols Engineering & Research Corp., New York.

Friday, May 12

9 a.m.—Registration and Exhibits open

10 a.m. (A)—Gray Iron Session
(Sponsored by Gray Iron Division)

Presiding—Fred J. Walls, International Nickel Co., Detroit. Co-chairman—G. A. Timmons, Climax Molybdenum Co., Detroit.

Correlation of Properties of Gray Iron—Richard G. McElwee, Vanadium Corp. of America, Detroit, and Richard Schneidewind, University of Michigan, Ann Arbor.

The Relaxation of Cast Iron—V. T. Malcolm and S. Low, Chapman Valve Co., Indian Orchard, Mass.

10 a.m. (B)—Steel Session
(Sponsored by Steel Division)

Presiding—L. H. Hahn, Sivyer Steel Castings Co., Chicago. Co-chairman—J. K. McBroom, Stainless Foundry & Engineering Co., Milwaukee.

Manganese Recovery in Acid Electric Steel Making—S. F. Carter, American Cast Iron Pipe Co., Birmingham.

Metal Composition Tests for the Steel Melter—H. H. Fairfield, Wm. Kennedy & Sons, Ltd., Owen Sound, Ont., Canada.

2 p.m. (A)—Joint Gray Iron and Malleable Session
(Sponsored by Gray Iron and Malleable Divisions)

Presiding — Richard G. McElwee, Vanadium Corp. of America, Detroit. Co-chairman—Victor A. Crosby, Climax Molybdenum Co., Detroit.

Dilatometer Studies of Nodular Cast Iron—N. A. Ziegler, W. L. Meinhart and J. R. Goldsmith, Crane Co., Chicago.

Nodular Iron vs. Section Size—Gosta Vennerholm, H. Bogart and R. Melmoth, Ford Motor Co., Dearborn, Mich.

2 p.m. (B)—Steel Session
(Sponsored by Steel Division)

Presiding—J. Juppenlatz, Lebanon Steel Foundry, Lebanon, Pa. Co-chairman—C. H. Lorig, Battelle Memorial Institute, Columbus, O.

The Fayalite Reaction in Sand Molds Used for Steel Castings—Howard F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass., and R. E. Savage, International Nickel Co., New York.

Relation of Thermal Gradients to the Soundness of Cast Steel Plates—H. F. Bishop, Naval Research Laboratory, Washington.

Influence of Core Mixtures on Hot Tears—Progress Report, Steel Research Committee, presented by committee chairman, Clyde Wyman, Burnside Steel Foundry Co., Chicago.

4 p.m. (A)—Joint Gray Iron and Steel Session
(Sponsored by Gray Iron and Steel Divisions)

Presiding—Thomas W. Curry, Lynchburg Foundry Co., Lynchburg, Va. Co-chairman—H. H. Kessler, Sorbo-Mat Process Engineers, St. Louis.

Principles of Risering—(colored slides)— Charles F. Walton, Case Institute of Technology, Cleveland.

Principles of Gating—W. H. Johnson, W. O. Baker, and W. S. Pellini, Naval Research Laboratory, Washington.

Finger Gating, Part II—(motion picture)—W. H. Johnson and W. O. Baker, Naval Research Laboratory, Washington.

4:30 p.m.—Registration and exhibits officially close.

FOUNDRY SHOW

POINTS WAY TO BETTER PROFITS

GLORIES of past exhibitions may fade into insignificance when the doors of the 1950 biennial Foundry Show are thrown upon at Cleveland's Public Auditorium on Monday morning, May 8, and foundrymen see the latest in foundry equipment and supplies against a background of dazzling displays. Numerous companies will unveil entirely new developments or recent improvements in machines and materials.

With a large and representative list of exhibitors providing show materials which will fill the entire underground exhibition space, and with four companies co-operating to provide a complete operating foundry for the production of aluminum castings, foundrymen gathering in Cleveland from all parts of the world will find much of interest and value in helping to attain improved quality and profits in foundry operations.

The show will be open from 10 a.m. to 9:30 p.m. on Monday, from 9 a.m. to 5:30 p.m. Tuesday and Thursday, from 9 a.m. to 3 p.m. Wednesday, and from 9 a.m. to 4:30 p.m. Friday. Monday also has been designated as "Northeastern Ohio Day" and all foundry workers from the metropolitan Cleveland area will be admitted from 1 p.m. until closing with special free admission cards being distributed by a committee of the Chapter in co-operation with the foundries of the district.

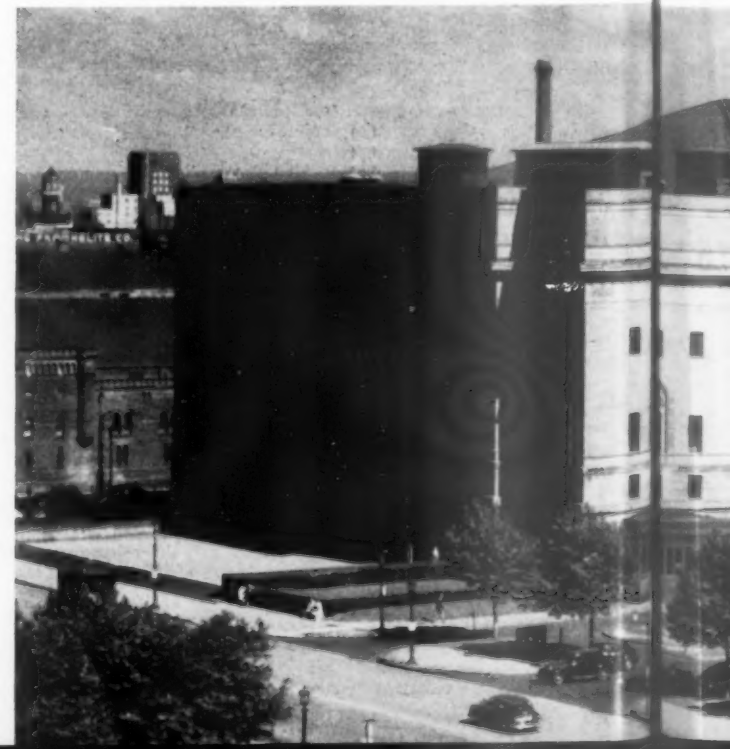
The list of exhibitors, corrected to Apr. 17, follows:

List of Exhibitors

Accurate Match Plate Co., Chicago
Adams Co., Dubuque, Iowa
Aerodyne Development Corp., Cleveland
Air Reduction Sales Co., New York
Ajax Electrothermic Corp., Trenton, N. J.
Ajax Engineering Co., Trenton, N. J.
Ajax Flexible Coupling Co., Westfield, N. Y.
Ajax Metal Co., Philadelphia
Allis-Chalmers Mfg. Co., Milwaukee
Alloy Metal Abrasive Co., Ann Arbor, Mich.
Alpha-Lux Co., New York
American Air Filter Co., Louisville, Ky.
American Colloid Co., Chicago
American Crucible Co., North Haven, Conn.
American Gas Association, New York
American Silica Sand Co., Ottawa, Ill.
American Steel Abrasives Co., Galion, O.
American Wheelabrator & Equipment Corp., Mishawaka, Ind.
Apex Smelting Co., Chicago
Asbury Graphite Mills Inc., Asbury, N. J.
Ayers Mineral Co., Zanesville, O.

Bakelite Division, Union Carbide & Carbon Corp., New York
Baroid Sales Division, National Lead Co., Chicago
C. O. Bartlett & Snow Co., Cleveland
Bay State Abrasive Products Co., Westboro, Mass.
Beardsley & Piper Division of Pettibone Mulliken Corp., Chicago
Black Products Co., Chicago
Black, Sivalls & Bryson Inc., Kansas City, Mo.
Blaw-Knox Co., Blawnox, Pa.
Blystone Division, Standard Sand & Machine Co., Chicago
Borden Co., Chemical Division, New York
British Moulding Machine Co. Ltd., Faversham, Kent, England
Buckeye Products Co., Cincinnati

Campbell-Hausfeld Co., Harrison, O.
Cannon Vibrator Co. Division, Berkshire Mfg. Co., Cleveland
Canton Chaplet & Mfg. Co., Canton, O.
Carborundum Co., Niagara Falls, N. Y.



Central Silica Co., Zanesville, O.
Centrifugal Casting Machine Co., Tulsa, Okla.
Chain Belt Co., Milwaukee
Champion Foundry & Machine Co., Chicago
Clearfield Machine Co., Clearfield, Pa.
Cleco Division, Reed Roller Bit Co., Houston, Tex.
Cleveland Flux Co., Cleveland
Cleveland Metal Abrasive Co., Cleveland
Cleveland Quarries Co., Cleveland
Cleveland Trade School, Cleveland
Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O.
Cleveland Vibrator Co., Cleveland
Climax Molybdenum Co., New York
Clipper Mfg. Co., Kansas City, Mo.
L. A. Cohn & Bro. Inc., Chicago
Coleman Engineering Co., Chattanooga, Tenn.
Combined Supply & Equipment Co., Buffalo
Corn Products Sales Co., New York
Crescent Machine Division, Rockwell Mfg. Co., Leetonia, O.

D C M T Sales Corp., New York
Davenport Machine & Foundry Co., Davenport, Iowa
Dayton Oil Co., Dayton, O.
Dayton Pneumatic Tool Co., Dayton, O.
Delhi Foundry Sand Co., Cincinnati
Delta Mfg. Division, Rockwell Mfg. Co., Milwaukee
Delta Oil Products Co., Milwaukee
William Demmler & Bros., Kewanee, Ill.
Detroit Electric Furnace Division, Kuhlman Electric Co., Bay City, Mich.
Diamond Clamp & Flask Co., Richmond, Ind.
Harry W. Dietert Co., Detroit
Joseph Dixon Crucible Co., Jersey City, N. J.
DoAll Co., Des Plaines, Ill.
Dougherty Lumber Co., Cleveland
Durez Plastics & Chemicals Inc., North Tonawanda, N. Y.

Eastern Clay Products Inc., Jackson, O.
Eastman Kodak Co., Rochester, N. Y.
Economy Tool & Machine Co., Muskegon, Mich.
Electric Controller & Mfg. Co., Cleveland
Electro Metallurgical Division, Union Carbide & Carbon Corp., New York
Electro Refractories & Alloys Corp., Buffalo
Exomet Inc., Conneaut, O.
Exothermic Alloys Sales & Service Inc., Chicago

Fanner Mfg. Co., Cleveland
Federal Foundry Supply Co., Cleveland
Federated Metals Division, American Smelting & Refining Co., New York
Fisher Furnace Division, Lindberg Engineering Co., Chicago
Foundries Materials Co., Coldwater, Mich.
THE FOUNDRY, Cleveland
Foundry Educational Foundation, Cleveland
Foundry Equipment Co., Cleveland
Foundry Equipment Manufacturers Association, Cleveland
Foundry Service Co., Birmingham
Foxboro Co., Foxboro, Mass.
Fox Grinders Inc., Pittsburgh
Freeman Supply Co., Toledo, O.
Fremont Flask Co., Fremont, O.

General Electric X-Ray Corp., Milwaukee
Girdler Corp., Thermex Division, Louisville
Globe Steel Abrasive Co., Mansfield, O.
Claud S. Gordon Co., Chicago
Gray Iron Founders' Society, Cleveland
Great Lakes Carbon Corp., Niagara Falls, N. Y.
Great Lakes Foundry Sand Co., Detroit
Great Western Mfg. Co., Leavenworth, Kans.

Harbison-Walker Refractories Co., Pittsburgh
Harnischfeger Corp., Milwaukee
Benjamin Harris Co., Chicago Heights, Ill.
Harrison Machine Co., Wesleyville, Pa.
Hercules Powder Co., Wilmington, Del.

Herman Pneumatic Machine Co., Pittsburgh
Hewitt-Robins Inc., New York
Hickman, Williams & Co., Cleveland
Hill & Griffith Co., Cincinnati
Hines Flask Co., Cleveland
Hoffman Foundry Supply Co., Cleveland
Frank G. Hough Co., Libertyville, Ill.
E. F. Houghton & Co., Philadelphia
Hougland & Hardy—Hardy Sand Co., Evansville, Ind.
Hydro-Blast Corp., Chicago
Hyster Co., Portland, Oreg.

Illinois Clay Products Co., Chicago
Illinois Testing Laboratories Inc., Chicago
Industrial Fabricating Inc., Eaton Rapids, Mich.
Industrial Minerals Co., Lancaster, O.
International Graphite & Electrode Corp., St. Marys, Pa.
International Molding Machine Co., LaGrange Park, Ill.
International Nickel Co. Inc., New York
Iron Lung Ventilator Co., Cleveland

Jeffrey Mfg. Co., Columbus, O.
William F. Jobbins Inc., Aurora, Ill.
Johnston & Jennings Division, Pettibone MuHiken Corp., Chicago
K & F Metal Spray Industries, Detroit
Kindt-Collins Co., Cleveland
Andrew King, Construction Engineer, Narberth, Pa.

Lester B. Knight & Associates Inc., Chicago
William Korn Inc., New York
H. Kramer & Co., Chicago
Kwik-Mix Co., Milwaukee
Laboratory Equipment Corp., St. Joseph, Mich.
Lava Crucible Co., Pittsburgh
R. Lavin & Sons Inc., Chicago
Leeco Products, Ferndale, Mich.
Link-Belt Co., Chicago

J. S. McCormick Co., Pittsburgh
Machine Design, Cleveland
Macklin Co., Jackson, Mich.
MacLeod Co., Cincinnati
Magnaflux Corp., Chicago
Manley Sand Co., Rockton, Ill.
Martindale Electric Co., Cleveland
Martin Engineering Co., Kewanee, Ill.
Master Pneumatic Tool Co., Cleveland.
Mathews Conveyer Co., Ellwood City, Pa.
Carl-Mayer Corp., Cleveland
Metallizing Co. of America, Chicago
Mexico Refractories Co., Mexico, Mo.
Michigan Smelting & Refining Division, Bohn Aluminum & Brass Corp., Detroit
Mid-West Abrasive Co., Owosso, Mich.
Millwood Sand Co., Zanesville, O.
Milwaukee Foundry Equipment Division of SPO Inc., Milwaukee
Minco Products Corp., Saginaw, Mich.
Mine Safety Appliances Co., Pittsburgh
Modern Equipment Co., Port Washington, Wis.
Monk Tool Co., Geneva, Ill.
Monsanto Chemical Co., St. Louis
Moulders' Friend, Dallas City, Ill.

Nassau Smelting & Refining Co., Staten Island, N. Y.
National Carbon Co., New York
National Crucible Co., Philadelphia
National Engineering Co., Chicago
National Foundry Association, Chicago
Newaygo Engineering Co., Newaygo, Mich.
New Equipment Digest, Cleveland
New Jersey Silica Sand Co., Millville, N. J.
Niagara Falls Smelting & Refining Division, Continental Copper & Steel Industries, Buffalo
Nichols Engineering & Research Corp., New York
William H. Nicholls Co., Richmond Hill, L. I., N. Y.
Norman Harrison & Co., Chattanooga, Tenn.
North American Smelting Co., Wilmington, Del.
Norton Co., Worcester, Mass.

S. Obermayer Co., Chicago
Oliver Machinery Co., Grand Rapids, Mich.
Osborn Mfg. Co., Cleveland

P M S Co., Cleveland
Pangborn Corp., Hagerstown, Md.
Peerless Mineral Products Co., Conneaut, O.
Peninsular Grinding Wheel Co., Detroit

Penola Inc., Chicago
Penton Publishing Co., Cleveland
George F. Pettinos Inc., Philadelphia
Pittsburgh Crushed Steel Co., Pittsburgh
Pittsburgh Lectromelt Furnace Corp., Pittsburgh
Power Tool Division, Rockwell Mfg. Co., Milwaukee
Precision Grinding Wheel Co., Philadelphia
Pyro Refractories Co., Oak Hill, O.
Pyrometer Instrument Co., Bergenfield, N. J.

Ready-Power Co., Detroit
Redford Iron & Equipment Co., Detroit
W. G. Reichert Engineering Co., Newark, N. J.
Reliable Castings Corp., Cincinnati
Republic Coal & Coke Co., Chicago
H. H. Robertson Co., Pittsburgh
Robinson Clay Product Co., Akron, O.
Roots-Connersville Blower Corp., Connersville, Ind.
J. O. Ross Engineering Co., New York
Rossborough Supply Co., Cleveland
Ross-Tacony Crucible Co., Tacony, Pa.
Rotor Tool Co., Cleveland
Royer Foundry & Machine Co., Kingston, Pa.

Safety Clothing & Equipment Co., Cleveland
Safety-First Shoe Co., Holliston, Mass.
Sand Products Corp., Cleveland
Claude B. Schneible Co., Detroit
A. Schrader's Son Division, Scovill Mfg. Co., Brooklyn, N. Y.
Schramm Inc., West Chester, Pa.
I. Schumann & Co., Cleveland
Scientific Cast Products Corp., Cleveland
Semet-Solvay Division, Allied Chemical & Dye Corp., New York
Severance Tool Industries Inc., Saginaw, Mich.
Simonds Abrasive Co., Philadelphia
Simplicity Engineering Co., Durand, Mich.
Smith Facing & Supply Co., Cleveland
Smith Oil & Refining Co., Rockford, Ill.
Smith & Richardson Mfg. Co., Geneva, Ill.
Werner G. Smith Co. (Division Archer-Daniels-Midland Co.), Cleveland
Solvay Sales Division, Allied Chemical & Dye Corp., New York
Sorbo-Mat Process Engineers, St. Louis
Spencer Turbine Co., Hartford, Conn.
SPO Inc., Cleveland
Standard Conveyor Co., North St. Paul, Minn.
Standard Horse Nail Corp., New Brighton, Pa.
Steel, Cleveland
Steel Shot & Grit Co., Boston
Steel Shot Producers Inc., Butler, Pa.
Sterling Wheelbarrow Co., Milwaukee
Frederic B. Stevens Inc., Detroit
Stoller Chemical Co., Akron, O.
Stroman Furnace & Engineering Co., Franklin Park, Ill.
Sutter Products Co., Dearborn, Mich.
Swan-Finch Oil Corp., New York

Tabor Mfg. Co., Philadelphia
Taggart Brimfield Co., Hammonton, N. J.
Thiem Products Inc., Milwaukee
Tincher Products Co., Chicago
Titanium Alloy Mfg. Division, National Lead Co., New York
Toledo Scale Co., Toledo, O.
Towmotor Corp., Cleveland
Tri-State Sand Co., Warrington, Pa.

Union Steel Products Co., Albion, Mich.
United Oil Mfg. Co., Erie, Pa.
United States Graphite Co., Saginaw, Mich.
United States Gypsum Co., Chicago
United States Reduction Co., East Chicago, Ind.
United States Rubber Co., New York
U. S. Hoffman Machinery Corp., New York

Vanadium Corp. of America, New York
Velsicol Corp., Chicago
Vesuvius Crucible Co., Pittsburgh

Wheelco Instruments Co., Chicago
Whitehead Bros. Co., New York
White Pine Lumber Co., Chicago
Whiting Corp., Harvey, Ill.

Zanesville Sand Co., Zanesville, O.

Convention Section

FIVE CHOSEN FOR AFS

Five men prominent in the foundry industry have been selected by the Board of Awards of the American Foundrymen's Society to receive special recognition during the 54th annual convention in Cleveland. Two medals and three honorary life memberships in the society will be presented at the annual banquet to be held at Hotel Statler, Wednesday evening, May 10.

CLARENCE H. LORIG—*Joseph S. Seaman Medalist*

★ Dr. Lorig, who is being honored with the award of the Joseph S. Seaman gold medal "for his many contributions to foundry metallurgy and for his constant stimulation of research in the cast metals field," has been assistant director of Battelle Memorial Institute, Columbus, O., since 1947. He is a graduate of the University of Wisconsin, Madison, and also received his graduate degrees from that institution. Working for a time in industry, Dr. Lorig was associated with Wisconsin Steel Co., Wisconsin Appleton Co., French Battery Co. and the Ladish Forge Co. He then became professor of mechanical engineering in charge of metallurgical courses at Drexel Institute, Philadelphia, joining Battelle Institute in 1930. Dr. Lorig has been active in the work of the AFS, serving as a member of its publications committee, the research and executive committees as well as being a former chairman of the Steel Division, and as a member of the Gray Iron Division advisory group. He also has been a generous contributor to the technical press.

RICHARD SCHNEIDEWIND—*William H. McFadden Medalist*

★ Dr. Schneidewind, who has been designated the William H. McFadden gold medalist, is being cited "for his valuable contributions to the malleable iron industry in connection with the graphitization of white cast iron and for his many contributions to the society and the metal castings industry." Born in Manila, P. I., Dr. Schneidewind studied at Wayne University, the University of Chicago, and was graduated from the University of Michigan in chemical engineering in 1923. His association with industry was as plant chemist for the Studebaker Corp. He then embarked upon a career in research for the University of Michigan where he studied malleable and gray irons, electroplating, metals used in power plants and powder metallurgy. Joining the teaching staff of the university in 1937, Dr. Schneidewind is now professor of metallurgical engineering. He is an active member of the ASM and ASTM. In the AFS Dr. Schneidewind is chairman of the college research projects committee, Educational Division, as well as a member of the executive and textbook committees.

AWARDS

CLYDE L. FREAR—*Honorary Life Member*

★ Mr. Frear, senior materials engineer for the Bureau of Ships, United States Navy, is being presented an honorary life membership in the AFS in recognition of "his long-time contributions to the society and for his work in co-ordinating the casting processes with Naval requirements." A graduate of Syracuse University, Syracuse, N. Y., and Queen's University, Ontario, Mr. Frear taught at Lehigh University, Bethlehem, Pa., and for three years following World War I was assistant professor of materials and metals at the United States Naval Academy post graduate school, Annapolis, Md. Prior to joining the Bureau of Ships, he served two years as metallurgical engineer in the foundry division of Kelsey-Hayes Wheel Co., Detroit, and held a similar position with Pitcairn Co., Pittsburgh Valve & Fittings Division, Barberton, O. He is a frequent contributor to the technical press.

RALPH L. LEE—*Honorary Life Member*

★ Mr. Lee, a member of the public relations department of General Motors Corp., Detroit, is well known in the foundry industry as a result of his monthly feature, "Man to Man on the Molder's Bench," in THE FOUNDRY and through numerous visits to foundries and talks before chapter meetings in all parts of the country. He is being honored with a society life membership "for his philosophical approach to the problems of the foundry industry and for his stimulation of pride of craftsmanship among foundrymen." With the exception of his first job which was with National Cash Register Co., Dayton, O., Mr. Lee has been associated with the General Motors Corp., serving with many of its divisions. He has been particularly interested in "human engineering" in connection with training foremen and supervisory personnel—and in the small foundry he operates as a hobby at his home in Birmingham, Mich.

EDWIN W. HORLEBEIN—*Honorary Life Member*

★ In accordance with its custom, the society is honoring its retiring president, Edwin W. Horlebein, with life membership in the society. President of the Gibson & Kirk Co., Baltimore, Mr. Horlebein is a native of that city and was educated in its public schools. He served a machinist's apprenticeship with the Baltimore & Ohio Railroad and during World War I was commissioned a second lieutenant. Following the war Mr. Horlebein joined the enginering department of the Dixie Mfg. Co., Baltimore, and in 1924 became associated with his present company. He is a charter member of the society's Chesapeake Chapter and was its first chairman. In serving the AFS, Mr. Horlebein has been a member of the executive committee of the Brass and Bronze Division, as well as a national director and vice president. He heads the Munitions Board's Brass and Bronze Advisory Subcommittee.

(Photos pp. 102, 103, 105, 107, 112, 114 by Carl McDo

WALTON L. WOODY
Honorary Chairman

WILLIAM G. GUDE
Chairman

FRED J. PFARR
Vice Chairman

F. RAY FLEIG
Treasurer

Convention Section

NORTHEASTERN OHIO CHAPTER

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National Malleable & Steel Castings Co.
WILLIAM G. GUDE, *Chairman*
THE FOUNDRY
FRED J. PFARR, *Vice Chairman*
Lake City Malleable Co.
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Hickman, Williams & Co.
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Smith Facing & Supply Co.
HOWARD C. GOLLMAR
Elyria Foundry Division, Elyria, O.
WALTER E. SICHA
Aluminum Co. of America
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Schauer Bronze & Aluminum Foundry

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Wellman Bronze & Aluminum Co.
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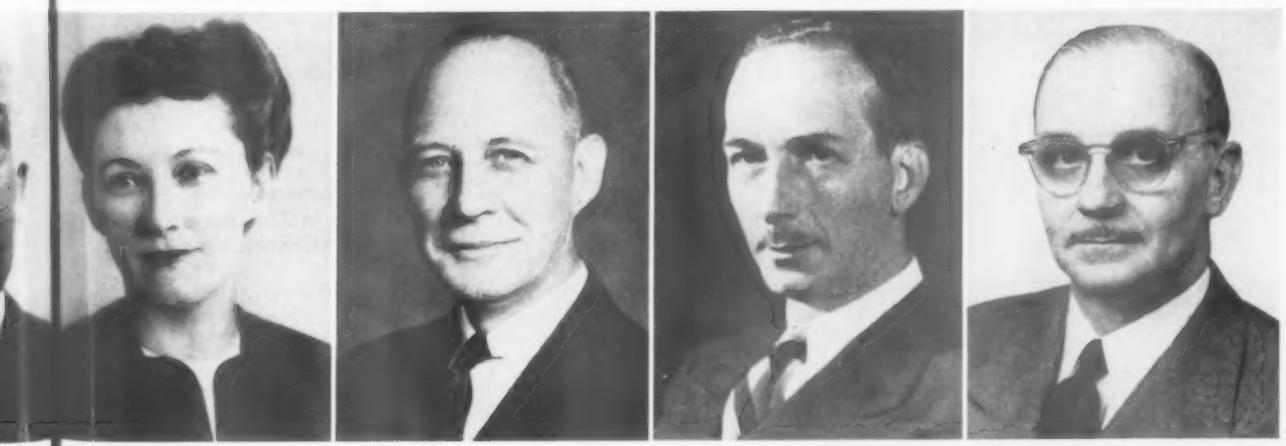

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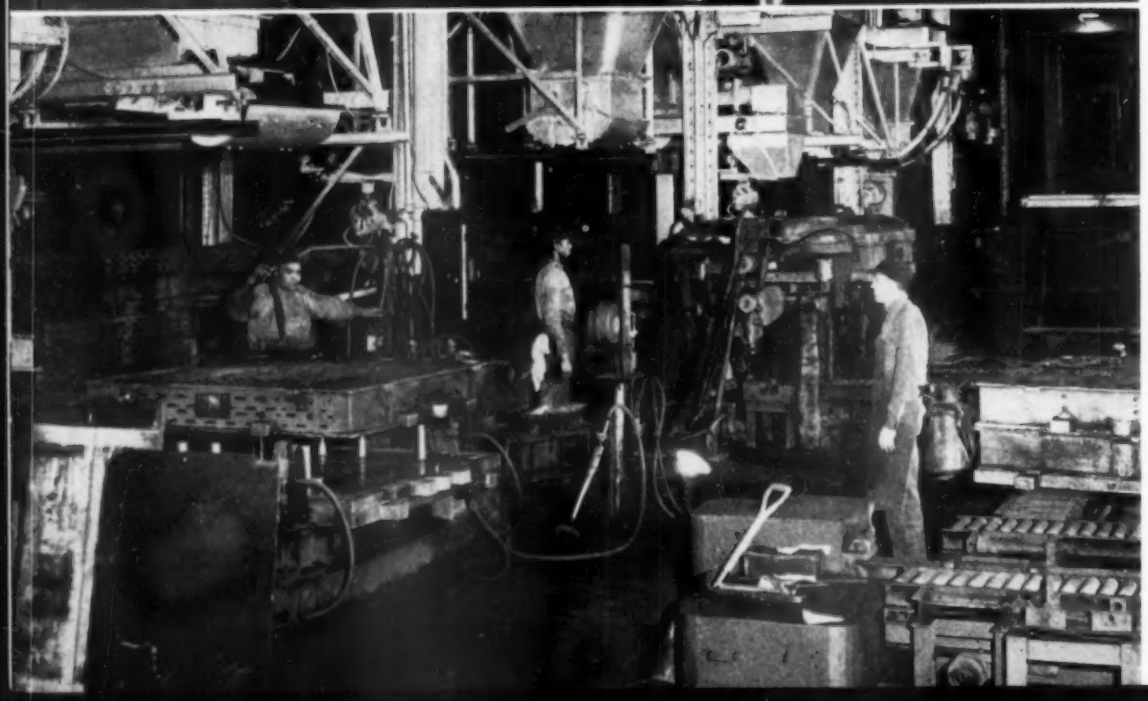
PLANT V

Setting out molds on power conveyor line at Superior Foundry Inc.

Checking pattern details in one department of Master Pattern Co.



Heavy machine molding in Aluminum Co. of America foundry

VISITATIONS AT CLEVELAND

Convention Section

A REPRESENTATIVE group of Cleveland's many foundries and pattern shops will be open for inspection by visitors to the AFS convention in that city. Arrangements for plant visitations have been made by a committee of the Northeastern Ohio Chapter headed by Lewis T. Crosby, Sterling Wheelbarrow Co., as chairman and John Schneider, Cleveland Electric Illuminating Co., as vice chairman.

Members of the committee will be available at a special booth located in Cleveland's Public Auditorium to assist those planning to visit the various shops which will be open for inspection. The table at right lists the plants which may be visited and the hours during which foundrymen will be welcomed. Accompanying illustrations depict operating scenes in a number of the brass and bronze, aluminum, gray iron, malleable iron and steel foundries and pattern shops included in the visitation schedule.

Type of work performed at these plants and public transportation available from downtown Cleveland follow:

Aluminum Co. of America, 2210 Harvard Ave.—Mechanized production of both large and small aluminum castings. Take Pearl limited bus No. 51 from Ontario and Prospect to West 25th and Denison; transfer to Harvard-Denison bus No. 18 east-bound to plant. Note: Visitors to this plant must register at the Plant Visitation booth not later than 1 p.m., May 8.

John Harsch Bronze & Foundry Co., 12502 Berea Rd.—Bronze and aluminum castings production, employing squeezer, bench molding and rollover equipment. Take Airport bus No. 76 from Ontario and Superior to plant.

Republic Brass Co., 1623 East 45th St.—Mechanized production of plumbing supplies. Take Wade Park bus No. 4 or Hough Ave. bus No. 38 from Federal building at Public Square to 45th street.

Master Pattern Co., 1315 Main St.—Designs and manufactures permanent molds, wood and metal patterns and models. Plant most easily reached by short taxi ride from downtown Cleveland.

Motor Patterns Co., 3035 East 61st St.—Produces wood and metal patterns, coreboxes, driers and permanent molds. Take Woodland No. 12 or Buckeye No. 13 trackless trolleys from East Fourth and Prospect to East 55th and Woodland. Transfer to East 55th streetcar southbound; alight at Truscon Ave. and walk east to plant.

West Steel Casting Co., 805 East 70th St.—Semimechanized production of truck, road machinery, machine tool and general jobbing castings. Take St. Clair car from Ontario and St. Clair to East 70th. Walk north to plant.

Crucible Steel Casting Co., Almira Ave. and West 84th St.—Mechanized production of locomotive, machine tool, power shovel and miscellaneous castings up to 1000 lb. Take Clark streetcar from south-west side of Public Square to plant.

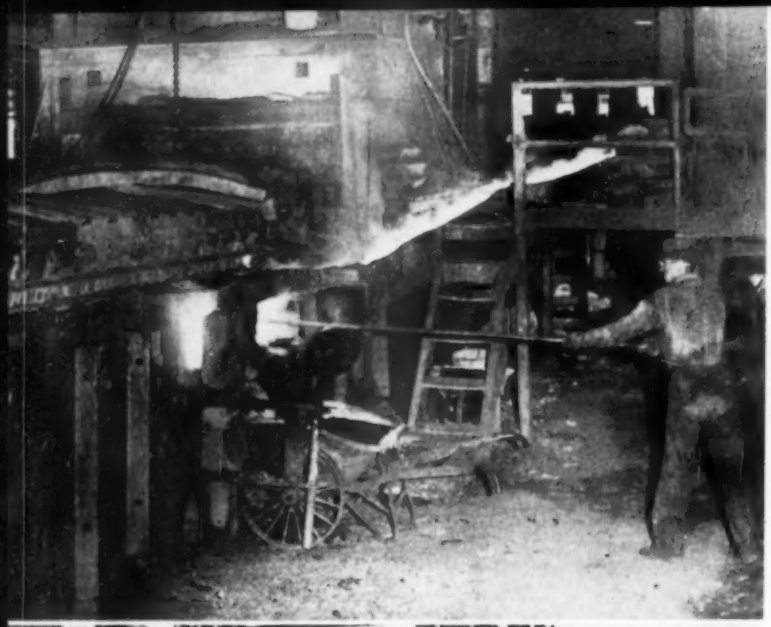
Bowler Foundry Co., 4255 East 49th St.—Medium and heavy floor work on machine tool and general machinery gray iron castings. Take Pearl limited bus No. 51 from Ontario and Prospect to West 25th and Denison. Transfer to Harvard-Denison bus No. 18 east-bound to East 49th and Harvard. Walk south on East 49th to plant.

Fulton Foundry & Machine Co., East 75th and Morgan Ave.—Mechanized jobbing and semiproduction work on heavy machinery, forming die, engine and pressure gray iron castings. Take Union trackless trolley No. 15 from East Second and Prospect to East 74th and Union. Walk north on East 74th to Morgan.

PLANT VISITATION SCHEDULE

	Mon. May 8	Tues. May 9	Thurs. May 11
NONFERROUS			
*Aluminum Co. of America	2-4	—	—
John Harsch Bronze & Foundry Co.		2-4	—
Republic Brass Co.		2-4	—
PATTERN SHOPS			
Master Pattern Co.		2-4	2-4
Motor Patterns Co.		9-12	9-12
STEEL			
West Steel Casting Co.		8:30-11	8:30-11
Crucible Steel Casting Co.		2-4	2-4
HEAVY GRAY IRON			
Bowler Foundry Co.		2-4	2-4
Fulton Foundry & Machine Co.		9-12	9-12
LIGHT IRON			
Allyne-Ryan Foundry Co.		9-12	9-12
Cleveland Foundry Co.		9-11:30	9-11:30
Ohio Foundry Co.		9:30-11:30	—
Forest City Foundries Co.		9-12	9-12
Superior Foundry Inc.		1-3:30	1-3:30
MALLEABLE			
Eberhard Mfg. Co.		9-12	2-4
National Malleable & Steel Castings Co.		9-12	2-4

* Visitors to this plant must register not later than 1 p.m., May 8.



Allyne-Ryan Foundry Co., Aetna Rd. and East 91st St.—Production of automotive and miscellaneous gray iron castings. Take Cedar limited bus at Public Square to East 105th; transfer to 105th bus, south-bound to East 93rd and Aetna. Walk west on Aetna to plant.

Cleveland Foundry Co., 2818 Harvard Ave.—Production of burner, stove plate, electric motor and miscellaneous light and medium gray iron castings. Take Pearl limited bus No. 51 from Ontario and Prospect to West 25th and Denison. Transfer to Harvard-Denison bus No. 18 eastbound to plant.

Ohio Foundry Co., 9812 Quincy Ave.—Production of automotive, machine tool, stoker, furnace and miscellaneous gray iron castings. Take Scovill bus No. 11 from East Fourth and Prospect to plant.

Forest City Foundries Co., West 94th St. and Maywood Ave.—Mechanized production of small and medium miscellaneous gray iron castings. Take Clark streetcar from south-west side of Public Square to West 94th and Denison. Walk south on West 94th to plant.

Superior Foundry Inc., 3542 East 71st St.—Mechanized production of light and heavy automotive, refrigeration, tractor, valve and miscellaneous gray iron castings. Take Union trackless trolley No. 15 from Prospect and East Second to East 71st and Union. Walk south on East 71st to plant.

Eberhard Mfg. Co., 2734 Tennyson Rd.—Mechanized production of automotive, electrical fittings and miscellaneous malleable iron castings. Take Buckeye trackless trolley No. 13 from East Fourth and Prospect to Tennyson and Buckeye. Walk south on Tennyson to plant.

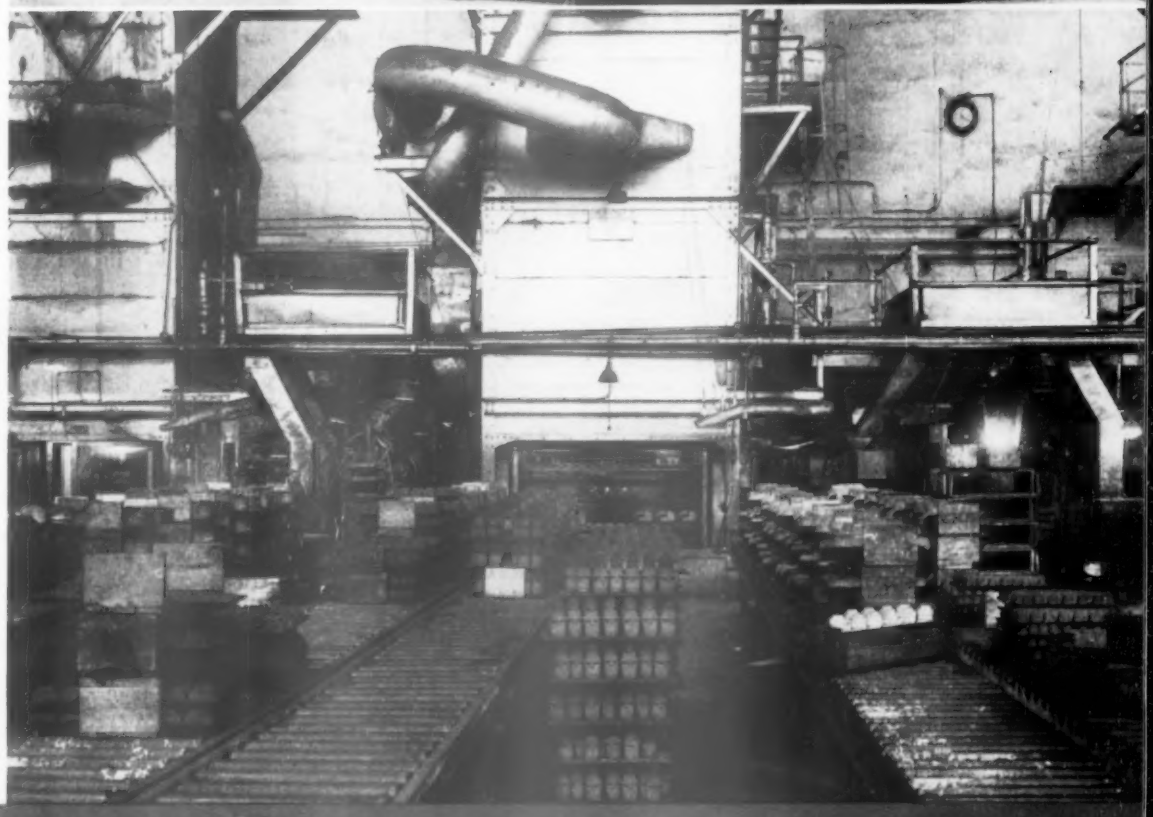
National Malleable & Steel Castings Co., 10600 Quincy Ave.—Mechanized production of automotive, marine and miscellaneous malleable iron castings. Take Scovill bus No. 11 from East Fourth and Prospect to plant.

Top left—Cupola-air furnace duplex melting at the malleable iron foundry of Eberhard Mfg. Co.

Left—Handling small cores in the modern coreroom of Cleveland Foundry Co.

Below—Metal patternmaking department in one section of Motor Patterns Co. plant

Mechanized molding, conveyor line, Forest City Foundries Co.



Tower ovens, coreroom of National Malleable & Steel Castings Co.

Below — Small casting molding line at Crucible Steel Casting Co.

By DONALD J. REESE
International Nickel Co. Inc.
New York

Economic Considerations In Producing MAGNESIUM—CONTAINING

This twisted C-clamp illustrates the ductility of magnesium-containing iron castings

SINCE A. P. Gagnebin and associates in the International Nickel Company Inc., and H. Morrogh and associates in the British Cast Iron Research Association made contemporary revelations of their respective work on the effect of magnesium or cerium additions to iron-carbon-silicon alloys, interest in the subject has been at an ever increasing rate throughout the world. As iron-base materials account for a very high percentage of all engineering materials used, the birth of a new iron-base material destined to win a significant position in the field of engineering materials is an event worthy of this recognition.

Though translation of the extensive research into foundry production is hardly one year old, thousands of tons of component parts have been produced. Axiomatic in the sound growth of these new materials is a requirement they should only be produced by those able and willing to become skilled in production techniques. A further requirement is the new material should be fully "proof-tested" in its potential applications before material changes are approved.

Just as we recognize the several types of steel as carbon, engineering alloy, stainless, tool steel, silicosteels, etc., and also the many grades in any one type, so in the magnesium-containing irons, there are several types and various grades in any one type. For example, there is a ferritic type of magnesium-containing iron and there are various grades within this type. Pure iron is a soft, ductile and moderate-strength material. Silicon additions within the limits of 1 to 4 per cent modify its properties appreciably. Small amounts of manganese, phosphorus and sulphur usually present in commercial irons, if added to pure iron would also modify its properties. As silicon is added in appreciable quantities, 1 to 4 per cent, the properties of strength and hardness increase while ductility decreases. The properties of one type of ductile iron parallel the properties of iron modified by silicon additions when all graphite present is in the spheroidal form and when due allowance is made for the small amount of impurities present in commercial irons.

Yield strength of a ferritic malleable iron is of the order of 35,000 psi. Yield strength of a ferritic magnesium-containing iron is of the order of 50,000 to 75,000 psi. Probably two factors account for difference in yield strength between the ferritic types of these two materials; one is the influence of silicon in the range of 1 to 4 per cent, and the other is the influence of an optimum form of graphite, a "spheroidal" form versus a nodular form.

The various types of magnesium-containing iron are: Ferritic, intermediate ferritic-pearlitic, pearlitic, acicular, martensitic and austenitic.

There is real concern within the foundry industry whether these new engineering materials will become competitive to other ferrous materials, especially mal-

Ductile or nodular iron has been in commercial production only a relatively short period, but various factors influencing the application of this new engineering material are becoming more apparent. The author discusses production costs, applicable raw materials and specifications for magnesium-containing iron produced in cast form

G IRON

leable iron and steel, and win markets the latter now serve. Experience, repeated time and again in the past, where a new engineering material seemed to seriously challenge other well established materials, shows that industry eventually found a proper place to use them all in ever increasing quantities. An industrial nation like ours thrives on ingenuity and is never static in its methods and materials of manufacture. There can be little argument that knowledge in the field of ferrous metallurgy has been significantly increased by the research investigation concerned with magnesium, cerium and calcium, and that this new knowledge will be helpful throughout the ferrous metal industry.

Magnesium-containing iron techniques ought to be of interest to the producer of malleable iron. Why? The chemistry of malleable iron is generally 2.5 per cent carbon and 1 per cent silicon. This chemistry imposes several limitations; one is section size in sand-cast procedures; another is engineering properties; and another, founding characteristics. As the properties of spheroidal graphite irons are only mildly affected by the amount of graphite present, the higher permissible carbons offer real aid in founding problems. The important alloy value of silicon may be utilized and, almost irrespective of the amount of carbon and silicon present, any section size may be produced. There would be relief from manufacturing problems in many operations between pouring a mold and shipment, and appreciable reduction of capital tied up in materials in process. The producer of malleable iron suffers from prolonged delivery limitations which could be reduced materially.

If some of the magnesium-containing iron-carbon-silicon alloys are evaluated on the basis of their metallurgical structure and engineering properties, they might be called "graphitic steels." Though currently accepted metallurgical definitions limit those materials which may properly be called "steel" to 2 per cent carbon or less, some of these newly developed materials pose a problem on terminology.

The metallurgist knowing the brinell hardness number of a piece of steel and wishing to ascertain its approximate strength multiplies the bhn by 500. At 200 bhn the piece of steel has about 100,000 psi tensile strength. The formula, tensile strength in pounds per square inch divided by the brinell hardness number equals 500, has a close parallel in properly made magnesium-containing irons. In the latter case the formula is: Tensile strength divided by the brinell hardness number equals 425; or the approximate ultimate strength is the brinell hardness number multiplied by 425.

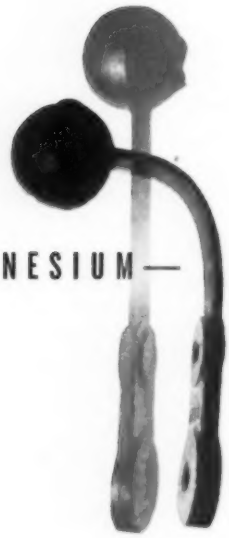
Cost of Magnesium-Containing Iron—The cost of component parts processed by the foundry varies appreciably with such factors as: Metal cost, amount of metal required, complexity of part, facilities and know-how of producer, size of order, repetitiveness of the business, pattern rigging, acceptance specifications, delivery requirements, etc.

My discussion on the cost of magnesium-containing iron is concerned with that segment of cost defined as "metal cost" and also is limited to direct costs of the producer. This excludes his indirect cost, overhead, selling and administrative expense and profit. The elements of cost are: Hot metal, educational expense, control expense, magnesium in some form (and ferroalloys) and royalties.

Let us assume the cost of hot metal in a gray iron foundry, using cupola melting equipment, is $50 per net ton. This may or may not be a proper basic cost on which to compute the additional costs of the process. Why? Well, the influence of spheroidal graphite on the engineering properties of the product is so great that the quality of the base iron probably can be lowered without sacrificing attainable properties. We could say the cost per ton of hot metal in producing a 60,000-psi flake graphite iron is greater than that required to produce a 40,000-psi iron, and its cost is greater than that required to produce a 20,000-psi iron. The end properties of magnesium-containing iron will be approximately the same whether the base iron is 20,000, 40,000 or 60,000 psi.

It is quite true that initial production of magnesium-containing iron in a gray iron foundry with cupola melting will start with the $50 hot metal cost because the new material is only a small fraction of total metal requirements. Later on it may be a large fraction or even account for all the production, which will permit changing the base iron to that most economical.

Two additional metal cost factors must be considered; one is that the part should be redesigned in section up to the properties attainable in the new material; and the other is concerned with a possible



MAGNESIUM— CONTAINING IRON

Part used on power lawnmower. Ductile cast iron piece is bent at right angle without cracking

improvement in yield of salable product obtained from a ton of hot metal.

Another illustration might be a malleable iron foundry using a cupola-air furnace duplex melting unit where we could assume a hot metal cost of $60 per net ton. Would this be a proper basic cost on which to compute the additive costs of producing magnesium-containing irons? The probabilities are very real this would not be a proper basic-cost and that it would be appreciably higher than necessary. Why? Well, the broader latitude in carbon and silicon chemistry would provide a wider choice in the selection of raw materials, some of which would be lower in cost. The factors of improved yield of salable product per unit of hot metal, and losses due to cracking, breaking and distortion of white iron, would be eliminated—all of which reflect in lowered costs. Melting would be a simpler problem. The high fluidity of a 3.5 per cent carbon iron versus a 2.5 per cent carbon iron, particularly when further corrected for the carbon equivalent of higher silicon, would lower the present requirement for 2850 to 2925° F tapping temperatures and lessen the need for pigging metal around the foundry because of temperature. The manganese and phosphorus chemistry of current malleable iron practice fits the requirements for ductile iron very nicely except that current adjustments of manganese to balance sulphur would be eliminated.

Having assumed a base metal cost of $50 in a gray iron foundry and a base metal cost of $60 in a malleable iron foundry, let us assume a further base metal cost of $70 in a foundry producing graphitic steel of approximately 1.5 per cent carbon and 1.0 per silicon. And then assuming a blast furnace hot metal cost of $35 per net ton, we can say that if the blast furnace metal was treated with adequate amounts of magnesium and poured into the same component parts now being made of graphitic steel, then the two materials or the component parts made of the two materials could have approximately equal engineering properties and that founding and manufacturing process problems would be in favor of the magnesium-containing blast furnace metal.

Educational expense is an important element of cost. It represents capital invested to acquire know-how and to "proof-test" the new material, and management expects this investment to be paid back. In many uses appreciable capital expenditure for "educational" purposes cannot be avoided. These unavoidable expenses are concerned with the proof-testing and the certification of new engineering materials. However, much of the producers' educational expense may be for his acquisition of know-how. In this field he may absorb the experience of others or go off on his own and learn the hard way. If he absorbs the long experience of others and uses good judgment and restraint in exploiting the development he will incur only nominal expense, but without these factors educational expense can be very high.

A third element of cost is control expense. It is essential to know the sulphur chemistry of the iron-carbon-silicon alloys to be magnesium treated, as the first function of magnesium is to eliminate sulphur. A year ago few private or commercial laboratories were equipped or informed on methods for determining magnesium in iron. The cost of making a magnesium determination was often $5 and as much as $10. Today laboratories are equipped to make the determinations and some make them for $1.25 per one sample per day. The foundry which has been checking the chemistry and engineering properties of its product frequently would experience approximately the same control expense in making ductile iron. The foundry which does not have facilities to check the chemistry and engineering properties of its products, but sends occasional specimens to commercial laboratories for checking, will experience additional control expense with ductile iron. Many malleable iron and steel foundries would not be affected by control expense on ductile iron but many jobbing gray iron foundries would. One foundry producing ductile iron in its gray iron foundry has been spending about $40 per product ton in control expense where its normal control expense on gray iron is very nominal.

The further element of expense is concerned with the additions of magnesium alloys to the metal. Although I have placed this element of expense in fourth position, this is the item that concerns most people. The objective is to use about one dollar's worth of

magnesium for two purposes; one to desulphurize, the other to produce a spheroidal form of graphite. This may be done with metallic magnesium but, since it oxidizes readily and has a low gravity, other forms of magnesium, such as magnesium alloys, are preferred to metallic magnesium.

A variety of magnesium alloys have become available for this purpose, generally selling in the price range of 15 to 75 cents per pound although some are higher priced. Most producers of these alloys have had limited production experience and limited markets for their product, and it is probable that current magnesium alloys prices will be bettered when production experience and large markets accrue. Some of the magnesium alloys are nickel base, some are iron base, some are copper base, and there are a variety of others. If the introduction of nickel or copper or some other alloy along with magnesium serves no useful metallurgical need, or in an extreme case actually poses an impossible metallurgical situation, it is obvious an improper alloy is being used.

There are instances where real metallurgical needs are compatible with the basic objective of producing spheroidal graphite and other cases where they are not. Suppose a piston ring foundry with a product yield of 30 per cent per unit of hot metal employed an 80 per cent Ni 20 per cent Mg alloy and used 1 per cent of this alloy. The initial production would contain 0.8 per cent Ni, but if the 70 per cent sprue and gates were used in the next heat it would contain 0.56 Ni plus another 0.8 added with the Mg alloy, and the second heat would have 1.36 per cent Ni. There would be a continual build up of nickel in the product effecting continual unwanted metallurgical changes in the product. A proper alloy to use in this case would be an iron-base magnesium alloy. Suppose a malleable foundry intending to produce ferritic malleable used a 70 per cent Cu 30 per cent Mg alloy and had a yield of 43 per cent. As revert was recycled back to the melting unit there would be a continuous increase in the Cu content of the product and from the malleable iron viewpoint the trend would be away from ferritic malleable to pearlitic malleable.

If we can accept the principle that the selection of a proper type of magnesium alloy must satisfy both economic and metallurgical objectives, then in the case of malleable iron we would not use 40 pounds of a 70 per cent Cu 30 per cent Mg alloy costing 70 cents per pound for production (and debit Cu with the additional cost of annealing to decompose pearlitic to ferrite) but would probably use some iron-base magnesium alloy at a lower cost.

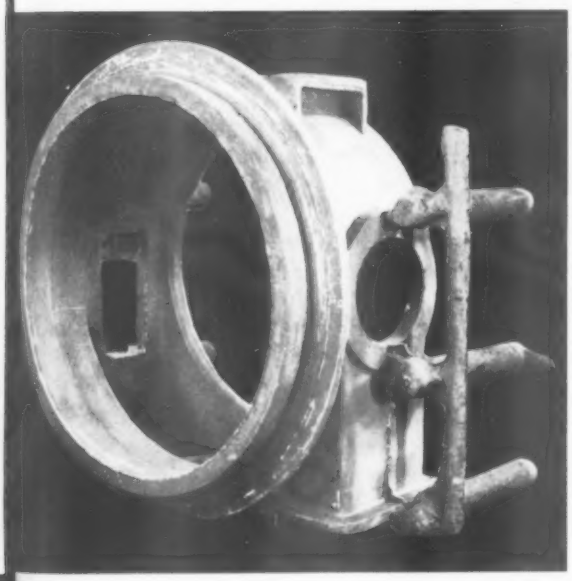
Cost of Alloys May Vary Widely

As the cost of the various magnesium alloys ranges between 15 and 75 cents per pound, as the use of these alloys per 2000 pounds of hot metal ranges from 15 to 70 pounds, and as the yield of salable product per ton of hot metal ranges from 30 to 90 per cent, one may select appropriate values for x (cost of alloy per pound), y (number of pounds) and z (per cent yield of salable product per unit of metal treated) in accord with one's desire to prove the process either modest or prohibitive in cost. With a 15-cent alloy, with the use of 15 pounds of the alloy, and with a 90 per cent yield, a product ton costs $2.50 for treatment. With a 75-cent alloy, with 70 pounds of alloy, and with a 30 per cent yield, a product ton costs $175 for treatment.

If one is realistic and wants to appraise probable costs he might figure 20 cents per pound alloy cost, 30 pounds used and a 60 per cent yield, which figures $10 per product ton for treatment. Normally the range of cost per product ton will be within the limits of $5 and $20. Referring back to the assumed costs of $35, $50, $60 and $70 referred to earlier for blast furnace, cupola, cupola-air furnace malleable iron, and graphitic steel, it might be pointed out that all or some of the treatment cost may be absorbed by lowering base metal costs.

The fifth element of cost is royalties. My company has been licensing and instructing companies in the production of magnesium-containing irons; the license involves a small annual minimum royalty in lieu of a tonnage royalty.

Raw Materials—The selection of raw materials to be used in the production of magnesium-containing iron will vary with the cost of raw materials, the type of melting furnace, grades of ore and burdens used in the blast furnace, with acid or basic melting practice, with the procedures in any one foundry, and with the most readily available raw materials in the producing area. These conditions vary widely



Heavy machine castings made of ductile iron. Base at left has net weight of approximately 40,000 lb. View above illustrates method of gating a casting

MAGNESIUM— CONTAINING IRON

Wrench made of ductile cast iron has section size of ⅝-in. and is about 2 ft long

from time to time in the United States and vary much more from the world viewpoint.

The chemistry objective in melting for the production of magnesium-containing iron is to obtain optimum values in carbon, silicon, manganese and phosphorus and minimum values in subversive elements.

The economic objective in melting for the production of magnesium-containing iron is to achieve the optimum chemistry with low-cost raw materials and low-cost techniques. Often, but not always, these two conditions can be readily satisfied with blast furnace metal. Blast furnace metal may not match the chemistry objective with certain types of ore or if the burden includes certain types of metallics. During World War II the burden in some blast furnaces in the United States included metallics to help increase hot metal output. When tin-coated cans were used the pig iron contained tin, a subversive element in the manufacture of malleable iron and magnesium-containing iron. Titanium is a subversive element in the manufacture of magnesium-containing iron when present in the product in appreciable amounts, and pig irons produced from titanium-bearing ores should be used with knowledge of safe limits on titanium.

The cost of converting solid metallics to liquid metal of adequate chemistry and temperature is quite low in cupola melting. Generally the cost of cupola-produced hot metal is greater than the cost of blast furnace metal, but when certain types of scrap are used or when the cost of scrap is low, cupola hot metal costs may be lower. A requisite in the melting department of a foundry is that the furnace should utilize "revert" metal, the use of direct metal being limited to processes where "revert" metal can be utilized elsewhere.

As the cupola is a carburizing-melting furnace, the metallic charge may be low in carbon even though a carbon of 3.4 to 3.8 per cent may be desired in the product. Up to now most cupola melting in the United States has been with fire-clay refractories (acid refractories). During the war a number of cupolas were operated with basic refractories, mainly in duplexing or triplexing operations, where low sulphur was desired in the end product, usually steel. It has been pointed out in previous articles that basic cupola refractory practice would be attractive in the production of magnesium-containing irons and that basic cupola operation would probably mature with the growth of these new materials. Basic cupola melting differs from acid cupola melting in that low-sulphur instead of high-sulphur products are achieved, the rate of carburizing is greater, the loss of "acid elements" such as silicon is greater, and the loss of "basic elements" such as manganese or magnesium is less. Even though basic refractories cost about five times as much as first quality fire-clay refractories, this element of additional cost should be readily compensated for in the final costs of producing the magnesium-containing irons.

Reference previously was made to a piston ring foundry and a malleable iron foundry, with yields of 30 and 40 per cent, respectively, to direct attention to the selection of the proper type of magnesium alloy. Now, if basic melting is used, the end product will be relatively high in carbon—approximately 3.8 to 4.0 per cent—completely compatible with the light section component parts, and the sulphur would be low, of the order of 0.02 per cent. This would require a minimum addition of magnesium alloy and permit the probable use of iron-, nickel- or copper-base magnesium alloys.

Many of the normal grades of bessemer or malleable pig irons may be used in the production of ductile iron. Many producers of merchant pig iron are furnishing a low-phosphorus or a low-phosphorus and low-manganese pig iron for this market. Practically any type of carbon steel, when adequately sized, is a good raw material. Automotive type cast iron scrap can also be generously utilized.

Specifications—It will be some time before any code making body or one of its committees will have time to study data on these new engineering materials and draft specifications. Meanwhile the materials are being produced and consumed. Some consumers have drafted their own specifications and others have asked for assistance in specifying the material.

We have not yet had time to test all types, grades and sections involved, but producers have furnished us data on a great many tests made on 1-in. keel bar sections of several types of this material. About 800 specimens produced commercially determined the basis for the following temporary specifications.

The minimum properties for any grade of a fully pearlitic type of magnesium containing iron showed:

Grade	TS psi	YS psi	E%
90-65-02	90,000	65,000	2.0

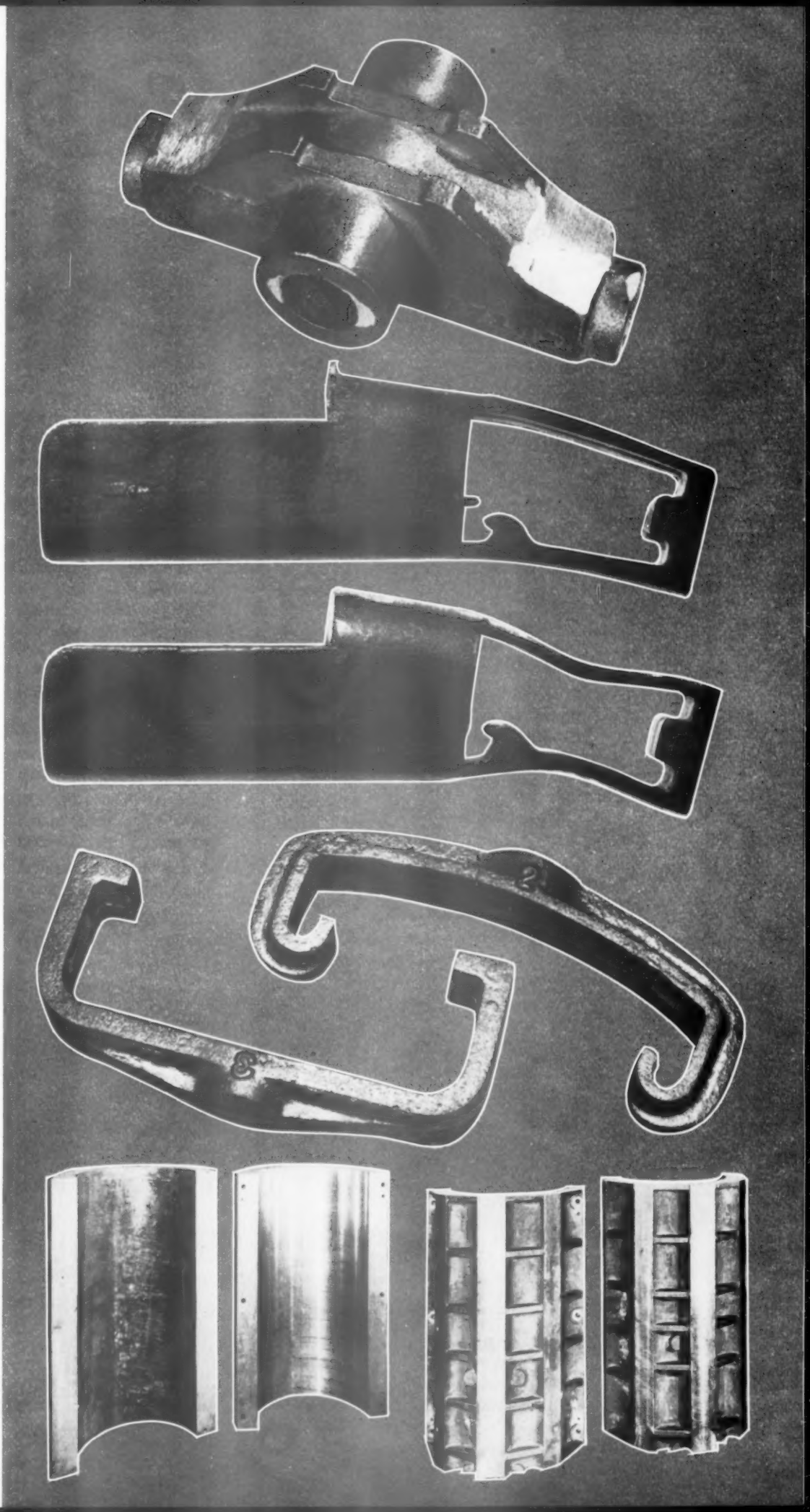
The minimum properties for two grades of an intermediate ferritic-pearlitic type showed:

Grade	TS psi	YS psi	E%
80-60-05	80,000	60,000	5.0
70-50-08	70,000	50,000	8.0

The minimum properties for any grade of a ferritic type showed:

Grade	TS psi	YS psi	E%
60-45-15	60,000	45,000	15.0

These properties are for irons containing not more than 0.10 per cent phosphorus.



Part for rear axle housing employed on heavy earth-moving machine

Two views of shotgun receiver casting. Note bent sections at bottom

Ductile iron castings used on the covers of water softener tanks

Views of opposite sides of dies used in forming wrought steel pipe

Gating and Risering

TIN BRONZE C

This is the first in another series of articles devoted to metallurgical considerations in the casting of tin bronzes. The present series will discuss gating, risering and the basic principles of casting feeding. Previous articles included "Solidification Mechanism of Tin Bronzes," presented in April and May, 1948, and "Effect of Gases on Tin Bronze," published in November and December, 1948

IN A PREVIOUS series of articles,[1, 2] the author expressed the opinion that the first of variables affecting soundness of the tin bronzes is the mechanism of dendritic growth, which is largely dependent upon the pouring temperature, since the quicker the metal freezes in the mold, the smaller are the dendrites. These, being small, offer less impedence to the molten metal flowing between the individual dendrites and the dendritic branches.

The second variable is the presence of more or less gas in the molten metal. This gas, being ejected at the moment of solidification, would have an appreciable effect upon the ability of the molten metal to fill the spaces between the dendrites. It was pointed out in the second of the articles, and also in those of other authors, that the lack of feeding between the dendrites and into the dendritic spaces would result in porosity in the casting. The amount of this porosity may range from well dispersed microscopic cavities to large gas holes, such as may be present when the metal purges in the mold.

Assuming that we have absolutely gas-free metal, and pour this metal into the mold at the correct temperature to give optimum physical properties,

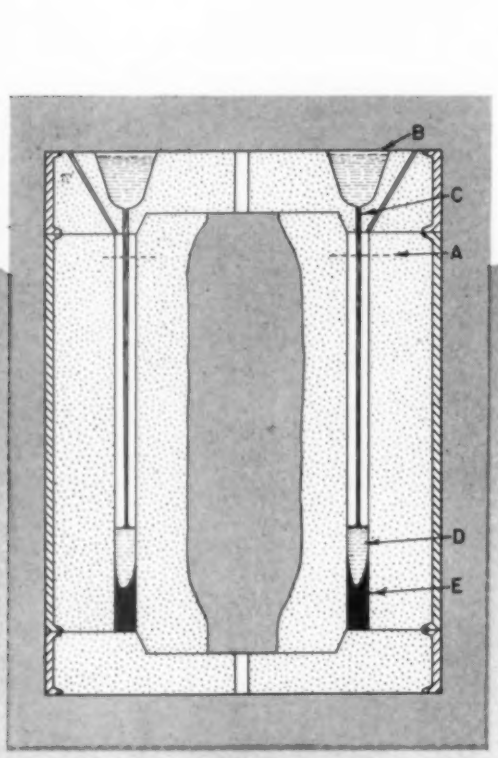


Fig. 1—Pouring tall vertical cylinder. *A*—Designed top of cylinder. *B*—Circular runner. *C*—Pencil gate. *D*—Solidifying metal. *E*—Solid metal.

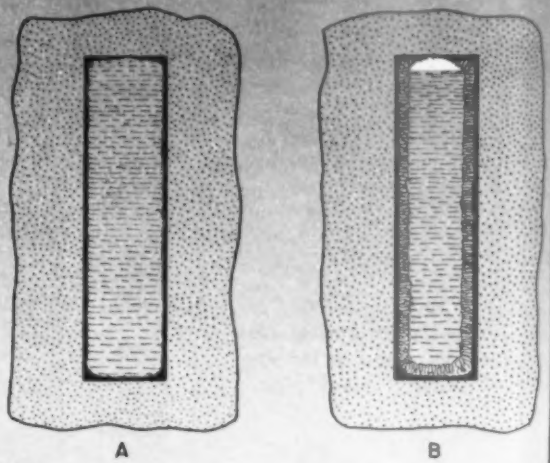


Fig. 2—Solidification of metal in a closed mold. *A*—Skin formation. *B*—Beginning of the shrinkage cavity. C—Solidification complete

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CASTINGS

there is yet a third variable which has a distinct bearing upon the soundness of the completed casting. If we do not provide complete feeding until the casting itself is entirely solid, porosity will probably result regardless of whether the other two variables have been kept under full control. It is usual to provide feeding risers, but little or nothing is commonly done to keep these risers open to the atmosphere while the casting is solidifying.

This may not be entirely the fault of the foundryman, however, as only recently have methods been developed to delay metal solidification in nonferrous risers in order to keep them open until the casting has frozen. The surface of an open riser will freeze over first where it is in contact with the air. Once the surface is completely frozen over, regardless of whether the remainder of the riser is still molten, feeding from this riser will practically cease. When feeding stops the riser may become more of a liability than an asset. Usually we would be better off if the riser could be removed from the casting at the instant its surface is completely frozen, because at this point it may start drawing metal from the casting.

Solidification in Mold Cavities—Before taking up a detailed study of riser design it will probably be best to give some consideration to the mechanics of solidification of metal in molds of simple design. Let us consider a simple rectangular casting, approximately 2 × 4 × 8 inches—a metal brick cast vertically in the mold. It has been said that a brick is the hardest shape to cast without shrinkage. This may be partly true, but the difficulty may be more psychological than metallurgical. It may be that a rectangular casting appears to be so simple that little care is given to providing correct risering. With intricate shapes, on the other hand, the molder is usually careful in his selection of gating and risering and a better casting is obtained.

As an example of this simple rectangular casting, consider a cavity of the correct size, upright in the mold, such a shown in Fig. 2A, completely filled with molten metal just ready to freeze. For the present we won't worry how the metal was placed in the mold; all we want at first is the completely filled mold cavity. This metal, being at the freezing temperature, is ready to start freezing as soon as any heat is removed. The first heat removed will be from the metal lying against the sand surface of the mold cavity and will result in the formation of a thin skin of solid metal completely lining the mold cavity. Conduction of heat from the interior will occur more slowly as this heat must traverse the metal layer and the heated sand surrounding the mold cavity.

On solidifying, the total volume of the metal in the mold will be reduced by an amount equal to the liquid-to-solid shrinkage. If the chilled envelope is completely impervious and has unlimited strength, the shrinkage of the next metal to solidify within this envelope would cause a very slight cavity to form at the top, as shown in Fig. 2B. This cavity is a vacuum. Continued solidification will cause an enlargement of this shrinkage cavity. When solidification is complete, the volume of this shrinkage cavity should theoretically be exactly the (*Please turn to page* 288)

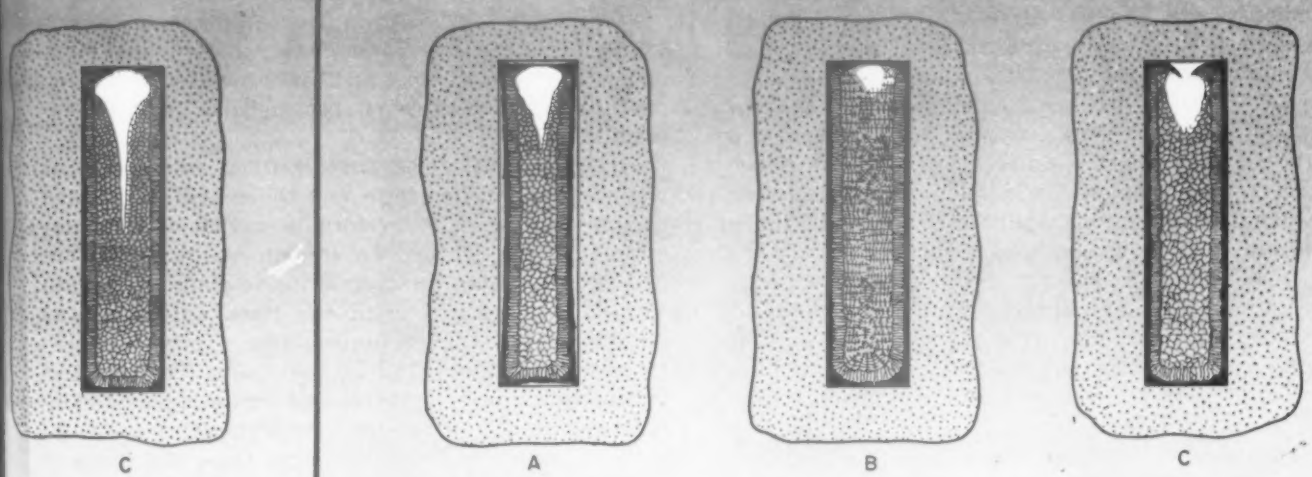

Fig. 3—Metal solidification. A—Effect of atmospheric pressure with unbroken skin. B—Shrinkage with rapidly growing dendrites. C—Shrinkage when atmospheric pressure enters mold

By WILLIAM G. GUDE
Managing Editor
THE FOUNDRY

New Process CASTS SOIL PIPE at High Rate

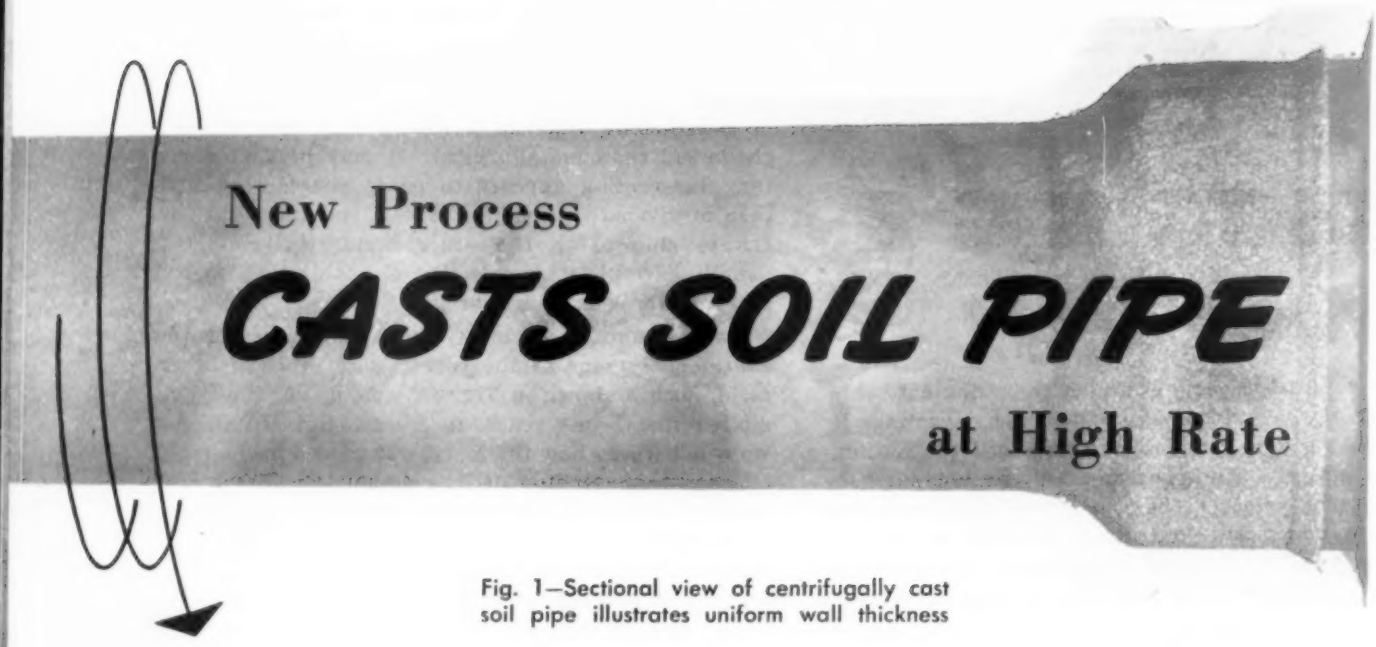

Fig. 1—Sectional view of centrifugally cast soil pipe illustrates uniform wall thickness

THE centrifugal casting process, long employed for the making of cast iron pressure pipe, is finding wider adoption for production of soil pipe. This development has been particularly marked since the war, concurrent with the rapid expansion in building activity and its accompanying heavy requirements for this cast tubular product.

One leading soil pipe producer which recently completed installation of centrifugal casting equipment is Combustion Engineering Superheater Inc. The process it employs at its Chattanooga, Tenn., foundry is particularly interesting from the standpoints of the high degree of mechanization, dimensional accuracy of the pipe, and production volume attained. The pipe is marketed under the trade name Superspun.

Combustion makes use of the Rol-O-Cast machine developed by the Herman Pneumatic Machine Co., Pittsburgh. This machine, which casts the pipe in sand-lined flasks, has been combined with an efficient self-contained sand handling system furnished by the C. O. Bartlett & Snow Co., Cleveland. Nerve center of the complete installation is an electronic control system; it automatically directs some 25 timed sequences in each complete cycle of operation. The unit requires approximately two minutes for each cycle, producing simultaneously four 5-ft. lengths of 40-lb, 4-in. ID pipe—the most popular size—in that period, and can turn out 100 or more lengths an hour. It is also possible to make pipe in diameters down to 2 in. on this machine.

The company for many years has produced soil pipe in static molds and still uses this practice for a large part of its total output. The centrifugal unit has been set up near the center of the foundry so as to be conveniently situated with respect to the melting department, and the observer is provided a marked contrast between the old and new casting methods. Probably most noticeable is the saving in manual effort effected by the centrifugal casting process. Operators required by the new unit include only one man to supervise the controls and set the hub cores, two pourers, and two men at the shakeout to remove the pipe. Additional men are employed in the sand preparation and coremaking departments.

The actual molding and casting operations are relatively simple; but the hydraulic and pneumatic mechanism and electric controls that make them possible are engineering achievements of a high order. To provide the reader a quick explanation of what the process involves, the sketch of Fig. 5 shows cross-sectional views taken from the center of one of the machine's four flasks during the principal steps of one complete molding and casting cycle. How each of these various steps is accomplished will be explained later.

The cylindrical flask first is filled with sand. It is then spun at 1000 rpm and the centrifugal action compresses the sand to form a cavity of irregular outline at the center. To smooth the sand surface and give the mold the desired inside diameter a mandrel is inserted and, with the flask speed reduced to 600 rpm, is offset horizontally a predetermined amount toward the wall of the flask. The mandrel is free to revolve on a bearing mounting and compresses the sand further to form a smooth inner mold surface of the required diameter. Once the mandrel is withdrawn the flask speed is raised to 850 rpm and the iron is poured. Thirty seconds later the metal has cooled sufficiently for the formed pipe and surrounding sand to be ejected from the flask.

Fig. 2 — Front view of casting machine. Sand is fed to flasks by the four overhead belts

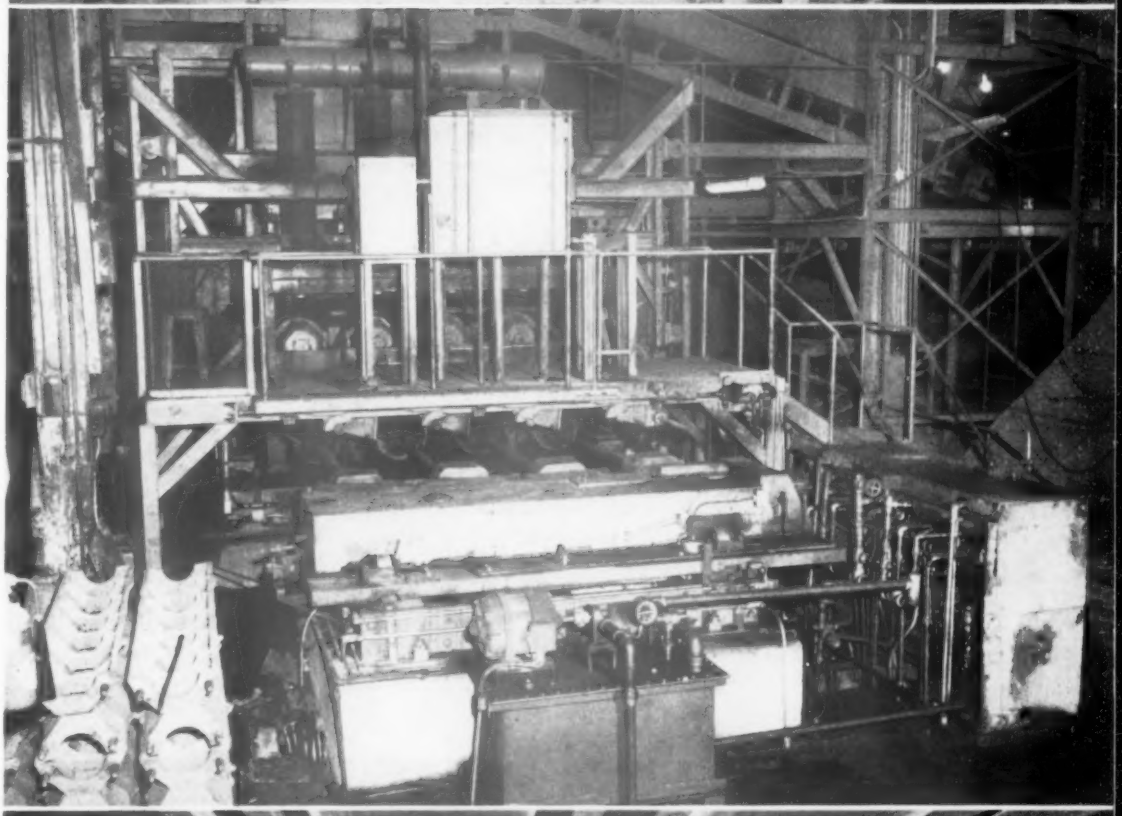

Fig. 3 — Rear view of casting machine. Mandrels to form mold surface are retracted

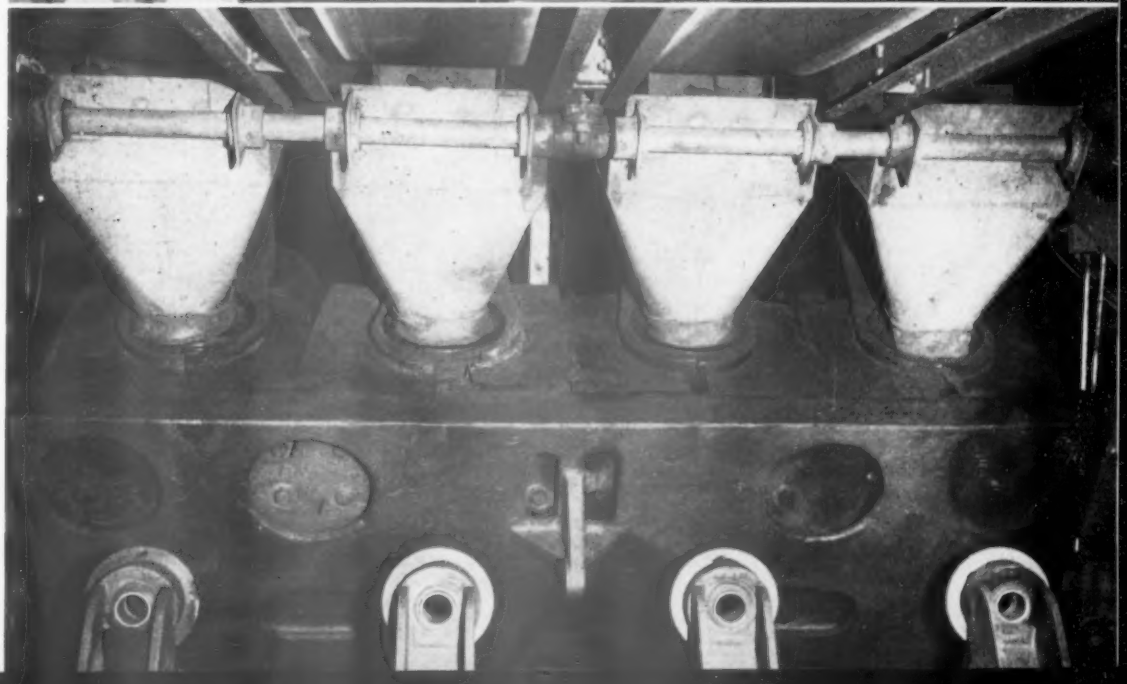

Fig. 4 — Sand is funnelled into the flasks when latter are tilted to 45-degree angle

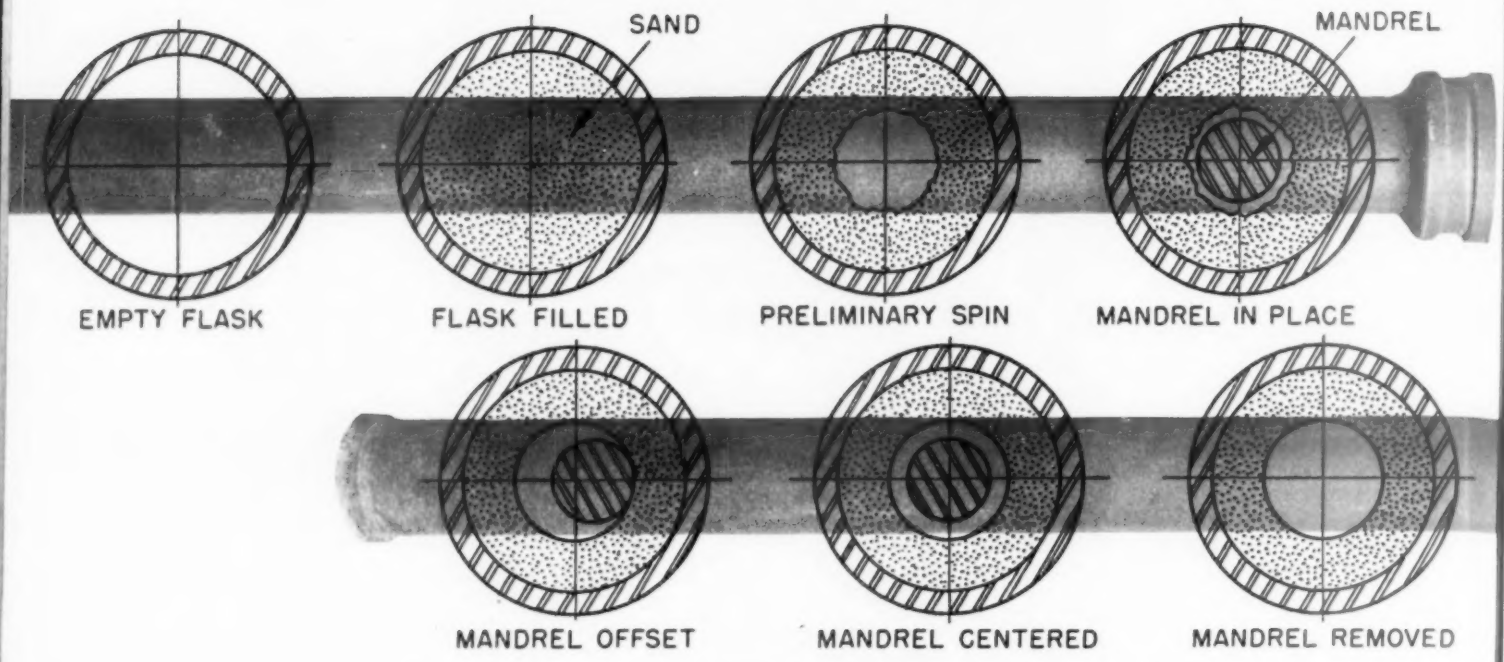

Fig. 5—Sketch showing cross-sectional views of one of the four flasks during the principal steps of one complete molding and casting cycle

Figs. 2 and 3 show front, or pouring, and rear ends, respectively, of the machine. The chief operator controls the machine from his station on the platform seen in Fig. 3. Above the machine in Fig. 2 may be seen pulleys of the four belt conveyors which draw sand from an overhead hopper and automatically feed it in the required amount into the four flasks. For this operation the flasks, which of course are in a horizontal position during actual casting of the pipe, are tilted by hydraulic power to a 45 degree angle, and the sand is deposited through funnels as shown in Fig. 4. When the flasks are returned to the horizontal position and spun, the ends are covered by the round pilot bearings seen at the bottom of Fig. 4 to retain and form the sand while the molds are being shaped. They also provide bearings for ends of the mandrels when the latter are inserted. Similar covers swing into position on the hub ends.

The mandrels which give the molds their final diameter and form core prints for the hubs are in the retracted position in Fig. 3. After they are withdrawn, and before the metal is poured, dry sand cores are placed in position to form the bell or hub at one end of the pipe. Four cores of the type shown at the right in Fig. 8 are located by hand by the machine operator on a fixture which moves up to the revolving molds where they are automatically picked off and positioned. (*Please turn to page* 258)

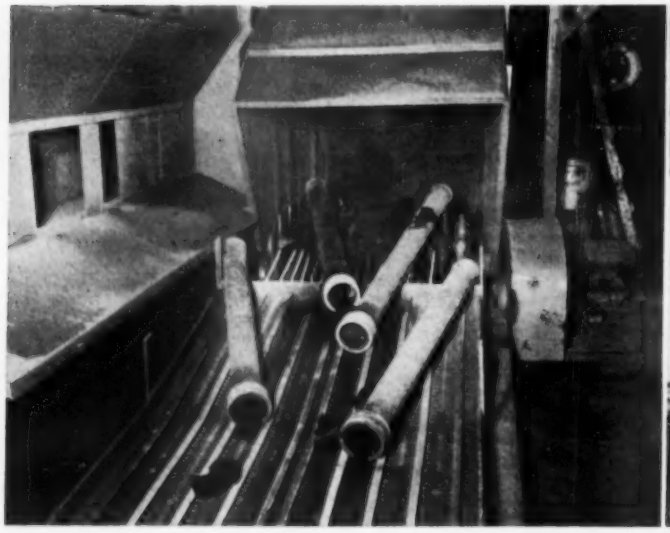

Fig. 6—Hooded shakeout screen receives pipe from under-floor conveyor leading from casting machine

Fig. 7—Sand from shakeout is returned by conveyor belt to storage bin for preparation and reuse

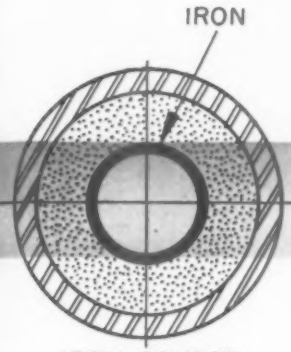

Fig. 8 (top right)— Part of the sand department. Cores at right form pipe hub

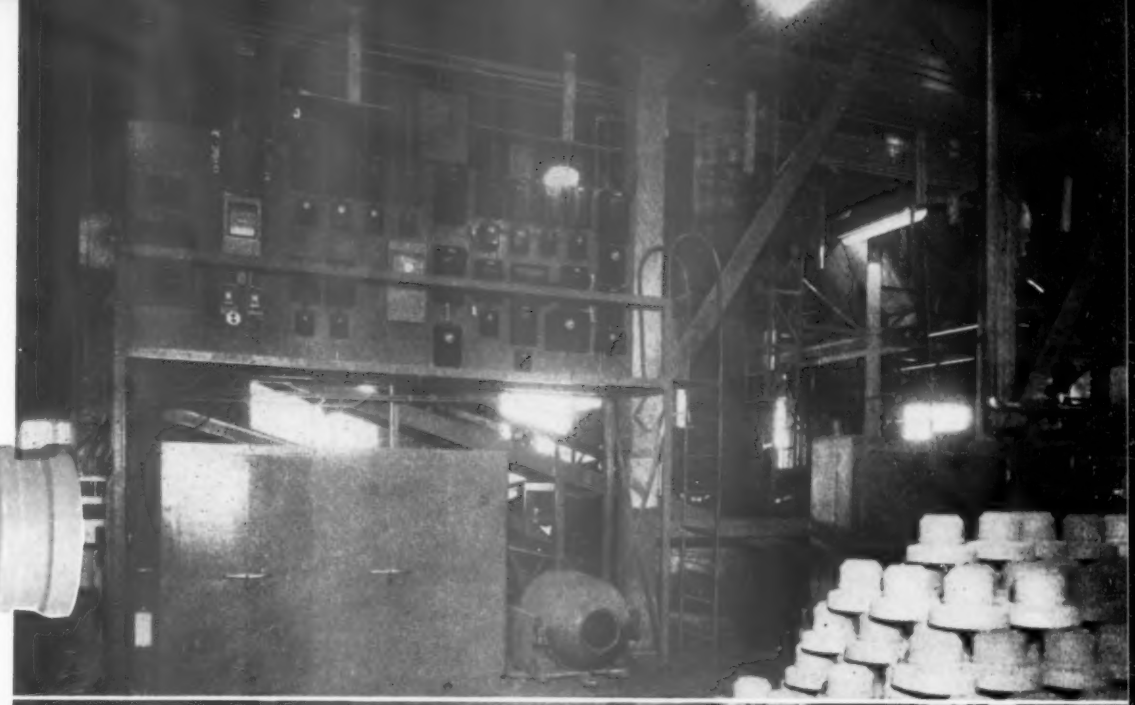

Fig. 9 — Filling the reservoirs with hot metal prior to pouring revolving molds

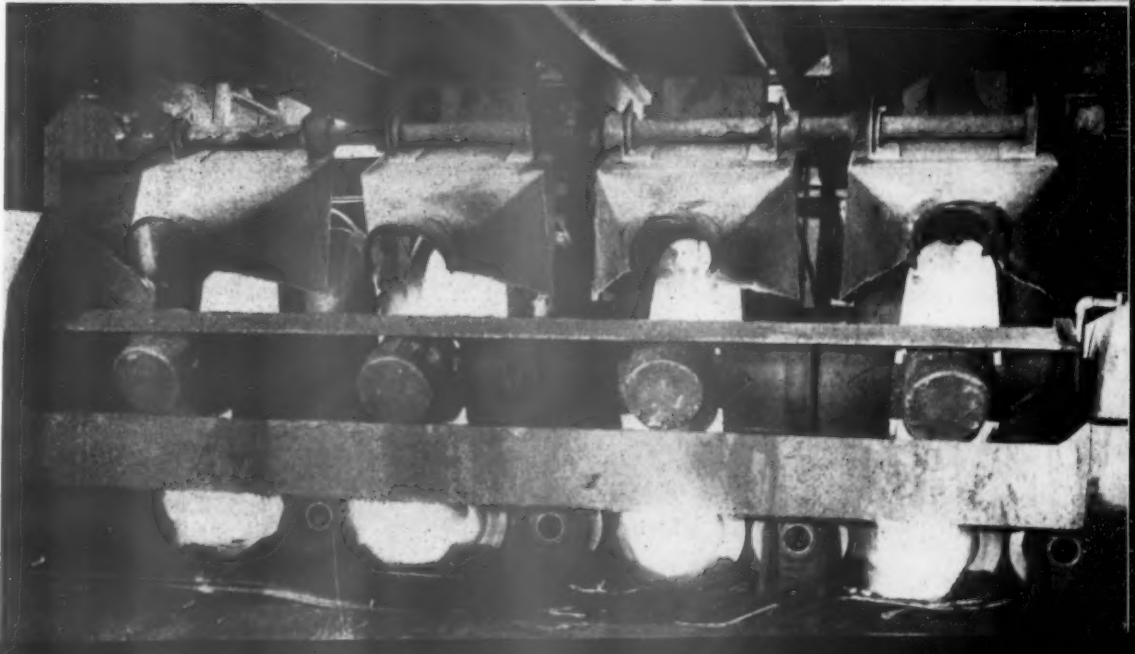

Fig. 10 — Tilting the reservoirs directs metal via pouring spouts into molds

(Photo courtesy Cincinnati Milling Machine Co., Cincinnati)

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What the Foundry Expects of the PATTERN

THE answer to what the foundry expects of the pattern shop might be expressed in few words in different ways, by different individuals By some foundrymen it would simply be "better patterns" and by some purchasing agents simply "cheaper patterns."

In defense of the pattern shop, probably neither of these answers would be generally justifiable; in fact, there is such a difference in foundry practice that a pattern completely acceptable or even as specified by one foundryman would be considered entirely wrong or inadequate by another.

It is true that patternmakers, by virtue of being a small, closely knit craft, are among the highest paid craftsmen in the foundry industry; therefore, the foundry should have the right to expect not only top quality and workmanship, but also judgment in the planning and making of pattern equipment. Because of the high wages paid patternmakers, the purchasing agent is inclined to the belief that pattern costs are too high. Sometimes this forces the pattern shop to relent under pressure and supply patterns cheaper in first cost but not adequate for good foundry production. Such patterns usually are much more expensive in the final analysis of casting costs, pattern maintenance and early pattern replacement.

Many varied situations and relationships exist between foundries and pattern shops, and to cover them all would open up an almost endless discussion. We have the commercial pattern shop and the captive pattern shop, and we have the captive foundry and

Co-operative planning by the engineering department, pattern shop and foundry offers the best procedure for economic and efficient production of castings, the author maintains. This paper, presented before a recent meeting of the Chicago Chapter of the AFS, also details various patternmaking fundamentals

Expects SHOP

the commercial or jobbing foundry. At times the commercial pattern shop is called upon to make patterns for the ultimate casting consumer, and the foundry is not brought into the picture until the patterns are made and the order ready to be placed for castings. This is not fair to either the pattern shop or to the foundry.

Sometimes the commercial pattern shop knows to what foundry the pattern will first be sent and can at least co-operate with that foundry in the making and rigging of the pattern. At times the commercial pattern shop makes patterns as overflow work from a company's captive pattern shop, and these patterns may go into the company's own foundry or to outside jobbing foundries. Considering these conditions, it is easily understandable that pattern equipment should be as flexible and yet as standard as possible and that setups for some particular foundry's rather special equipment should be avoided as much as possible. Many varying conditions surrounding the captive pattern shop have been encountered. In one instance with which the author was familiar the superintendent was as much of a dictator as John L. Lewis. He furnished pattern equipment of his choice to the company's foundry with no more regard for the ultimate cost of castings than John L. has for the cost of coal to the consumer. This pattern shop operated on a budget and the lowest new-pattern cost reflected to the credit of the pattern superintendent and to the complete disadvantage of the company's foundry and of the cost of castings to the company. Such a situation is, of course, deplorable and cannot and obviously did not continue for long.

In general, captive pattern shops, if not directly under general foundry management, are under general plant management and on a co-operating and co-operative basis with the foundry. The captive pattern shop may make patterns to be used in the company's own foundry or it may also make patterns to be used in outside foundries. In either case it is usually in a position to co-operate with the foundry which is to use the pattern equipment.

The staffs of many larger companies have a pattern engineer, whose duties are actually those of liaison between the engineering or development engineering departments, the pattern shop and the various foundry departments, including molding, core, cleaning, and industrial engineering or time study departments, if the castings are to be made in the company's own foundry. If patterns and/or castings are to be made in outside shops, the pattern engineer works through the company's purchasing department in contact with the outside shops. This arrangement of a pattern engineer has been found to yield untold benefits in saving time and money and improving production.

When, in smaller scale operations, there is no pattern engineer, then the same results should be obtained by close co-operation between the corresponding individuals and departments, and it would seem logical that the pattern shop should be the liaison between the engineering department and the various foundry departments.

Usually Reasonable and Co-operative

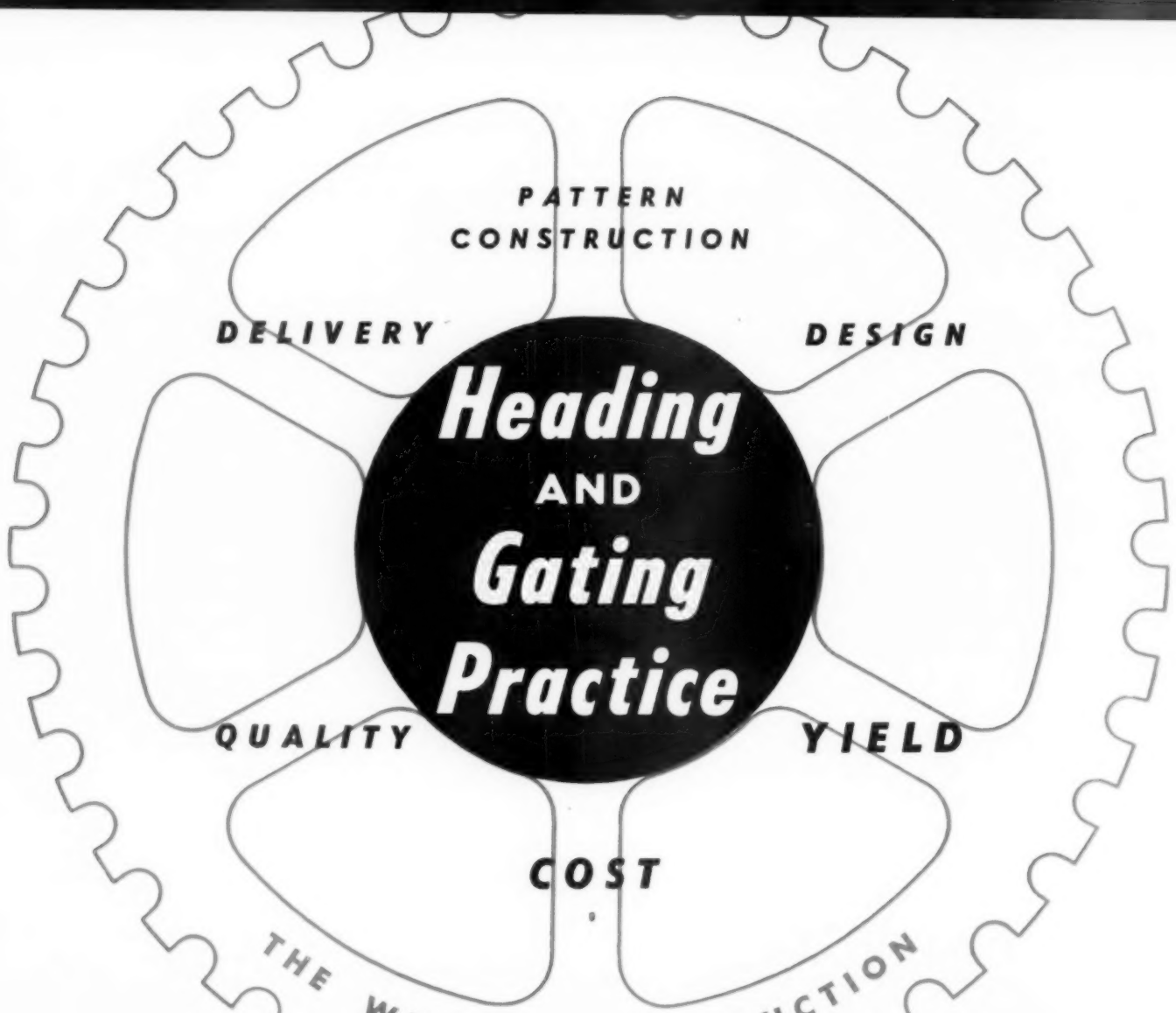
On many occasions we have heard the engineering department cussed and discussed for a particular design, either by the pattern shop when making a pattern or by the foundry after receiving a pattern. In a fairly broad relationship, however, working with engineers, pattern shops and foundries, sometimes on the purchasing end, sometimes on the selling end, I personally have found engineers reasonable, extremely co-operative and anxious to obtain the best castings with maximum advantage to the pattern shop and foundry. It is a fact, too, that our engineers of today are being better educated in foundry practice and have a better understanding and realization of foundry problems than did our general run of engineers in the past.

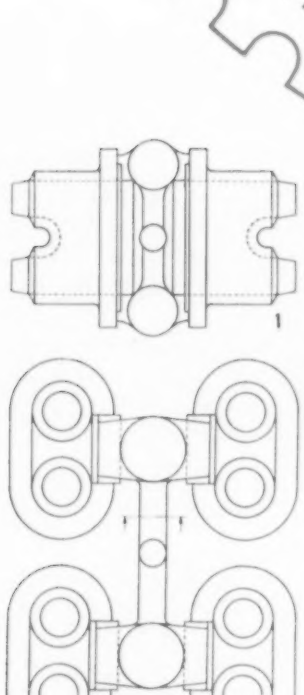
I might also add that I have known some extremely arbitrary pattern shop superintendents who seemed to take the attitude of "This is the way they designed it—this is the way we'll make it."

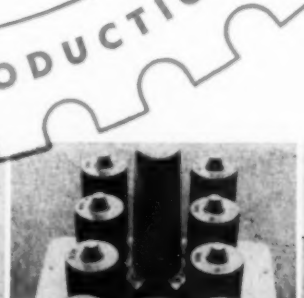
The problem then resolves itself into one complete co-operation between the engineering department, pattern shop and foundry involved and, if we were to answer generally "what the foundry expects of the pattern shop," the most valuable answer would be "close and complete co-operation."

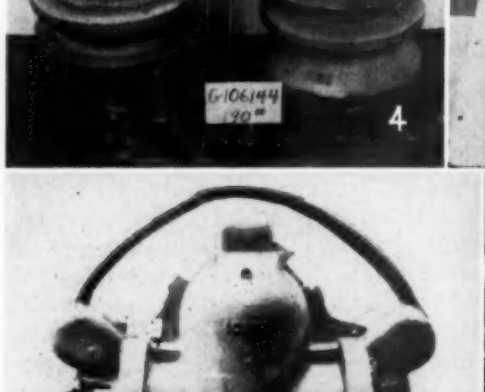
Assuming, that this co-operation does exist, as it should, and assuming that the pattern shop will be the liaison, it is natural that certain definite information must be furnished by the foundry departments before the pattern is started, or even before its cost is estimated. We must assume also, of course, that the production department or purchasing department specifies the correct quantity of castings to be made from the pattern equipment, as that correct information is essential (*Please turn to page* 306)

Heading AND Gating Practice









The important influence of heading and gating on quality, cost and yield in the steel foundry is illustrated by the authors by citing examples of specific castings. This paper was presented at the Wisconsin Regional Foundry Conference, Milwaukee, Feb. 9-10

By FRED B. RIGGAN
and HAROLD SCHULTE
The Key Co.
East St. Louis, Ill.

IN THE different methods of producing steel castings, we feel the heading and gating practice exerts the most important influence on the other operations. What might be considered the "wheel" of production would have heading and gating as its hub. The six spokes of this wheel would be (1) pattern construction, (2) design, (3) yield, (4) cost, (5) quality, and (6) delivery. All of the spokes are equally important in supporting the rim and allowing the production wheel to roll.

The Key Co. produces oil refinery and power plant equipment and high-quality commercial steel castings. We operate our own pattern shop, machine shop and engineering offices. Acid electric melting and bottom-pour ladles are employed.

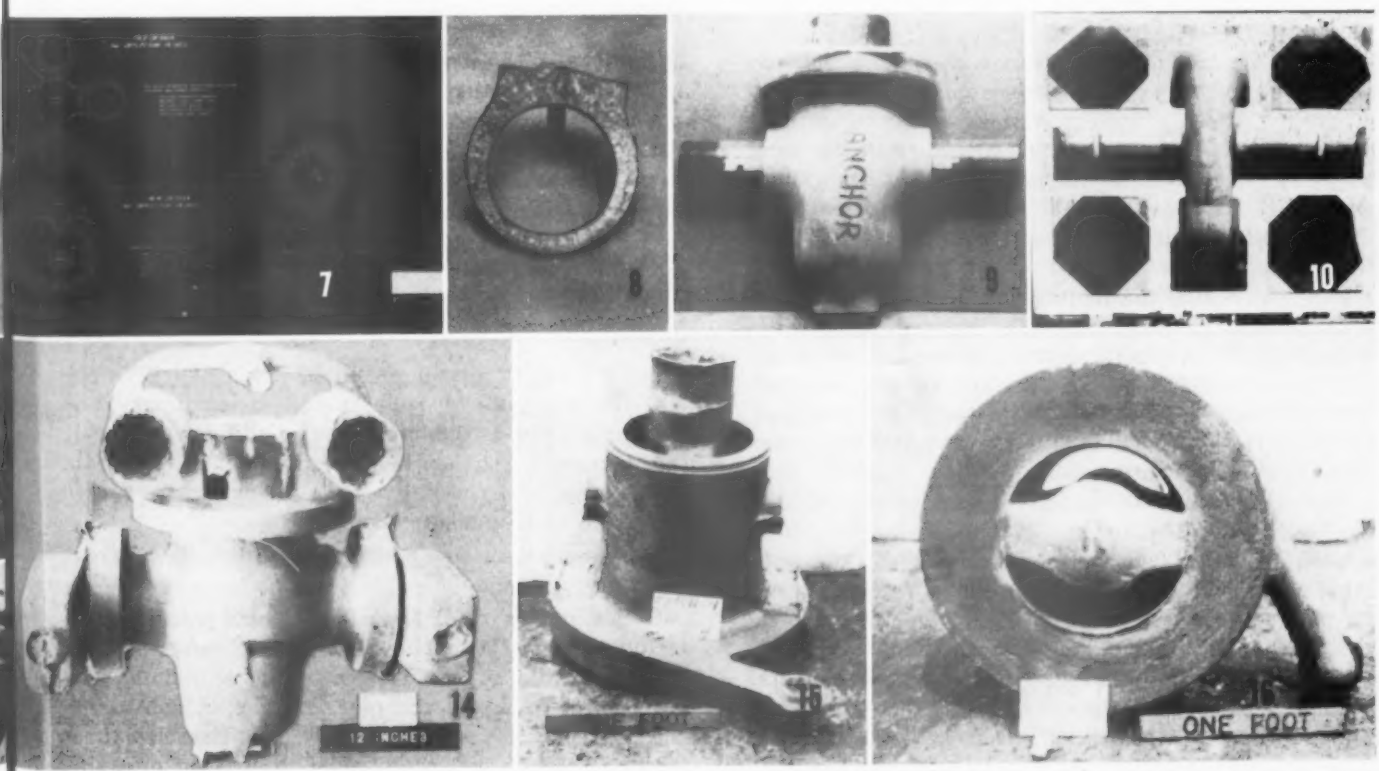
Pattern Construction—Before any pattern construction begins, the pattern shop foreman is instructed from a print just how the pattern is to be headed and gated. For example, we were presented the problem of producing a fairly large quantity of 46-lb, two-hole flanged fittings (Fig. 1). Our sales department reported the original producer had trouble with shifts and dirt and was unable to maintain casting contours. The casting had been made in a horizontal position with two patterns per mold. Yield was low, burning was excessive and considerable grinding was involved.

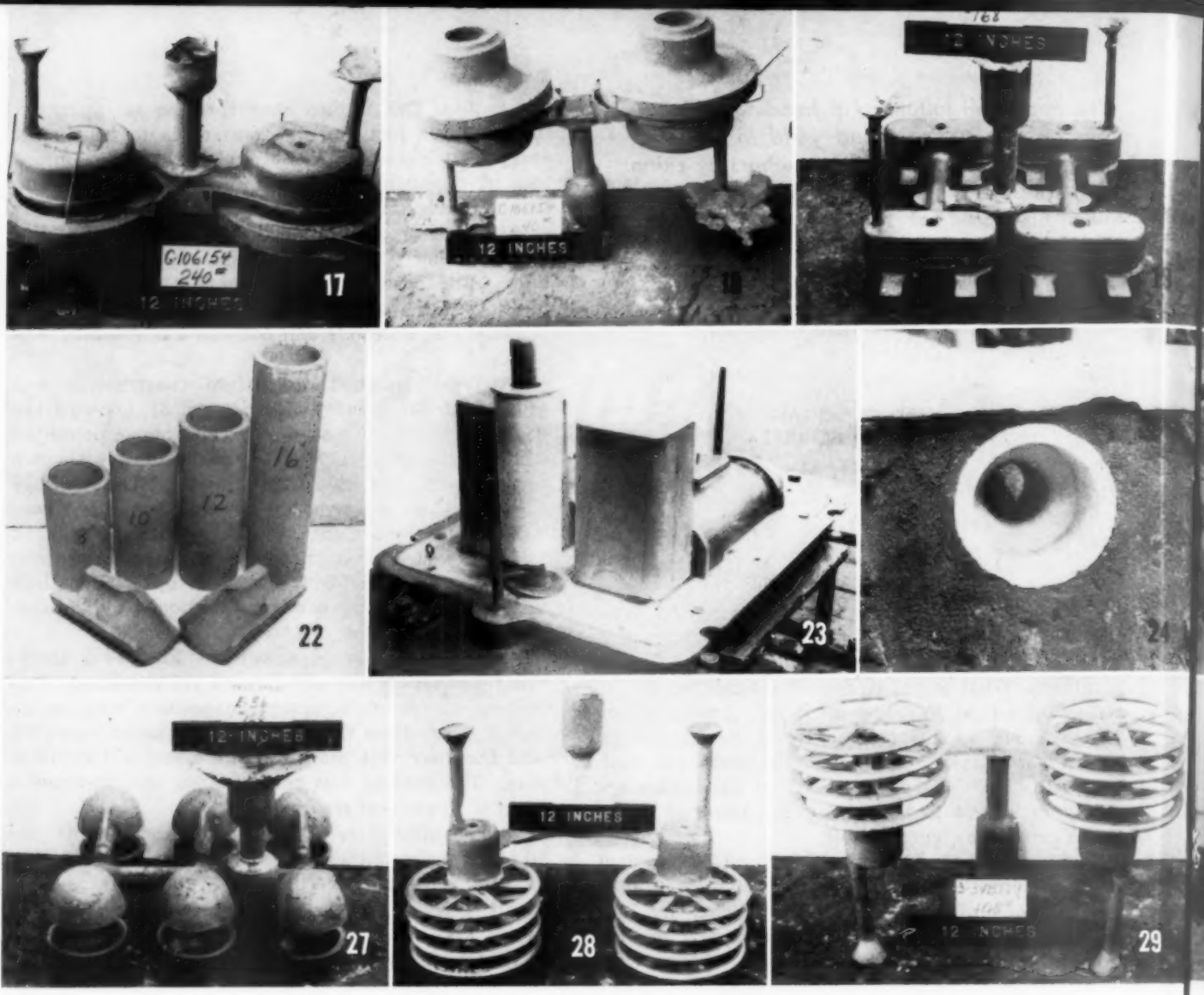
A vertical method of pattern construction was selected at our foundry (Figs. 2 and 3), allowing the heavy flange to be cast down. This change permitted doubling the number of pieces in the mold without a corresponding increase in flask size. The castings then could be gated from the bottom. A special Washburn core arrangement was used which gave sound castings, a sharp reduction in cleaning room cost and a 62½ per cent yield. With this setup 3500 castings were produced; only one was questioned by the customer.

Another example is shown in Fig. 4—a three-flanged sprocket into which teeth are machined. This casting was made in a vertical position with an internal riser. Here the casting served as an insulator, and the riser was more efficient using a 1-in. thick core. The casting was poured down the riser and a yield of 75 per cent resulted.

Fig. 5 illustrates pattern construction and the heading and gating system of a 12-in. bearing casting. It also was made vertically. Eight patterns were easily arranged in a 24 x 30 in. flask. Only two risers were needed—one open and the other blind.

Design—Every effort should be made by the foundry to supply castings to customers' specification.





However, often it is possible to make slight changes in design—with the customer's approval—and make a better casting at increased yield and lower overall costs. As an example, Fig. 6 shows how, by a very slight increase in metal thickness between the flange and the seat section area, it was possible to feed the flanges, body and seat areas without risering the seats.

Fig. 7 indicates the methods used before and after a design change was made. The old setup had these undesirable features: Excessive burning and grinding; only four patterns per mold; knock-off cores that were difficult and expensive to attach. The new setup, with the casting's upper section increased, overcame these disadvantages.

Fig. 8, showing a section cut from the center of weldable U-bend casting, illustrates the use of a graduated wall. The thickest section is at the riser attachment and gradually thins out as it moves away from the riser, with the resulting solid section shown.

A large 7-in. valve body is depicted in Figs. 9 and 10. Permission was received to increase the metal section between the flange and the seat area, and here again the necessity of risering the seat areas was eliminated.

Quality — The inspection department, of course, maintains the quality standards, but so that the castings will pass inspection without too much unnecessary work our foundry has established certain definite procedures, such as:

1. Temperature control. In some cases we have found that a 50-degree variation in temperature was the difference between success and failure.

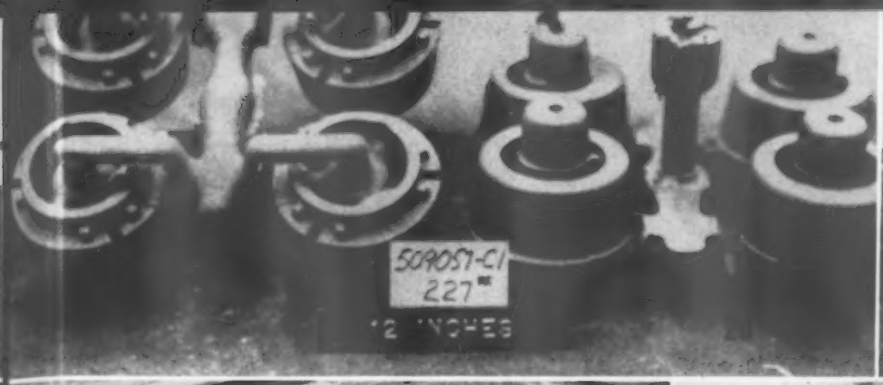
2. Gating into a riser tangentially wherever possible.

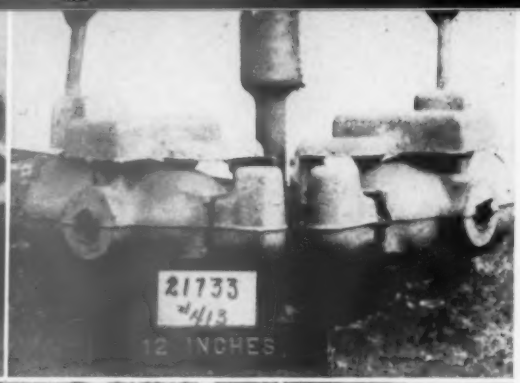
3. Pouring up-hill to eliminate scabs and misruns.

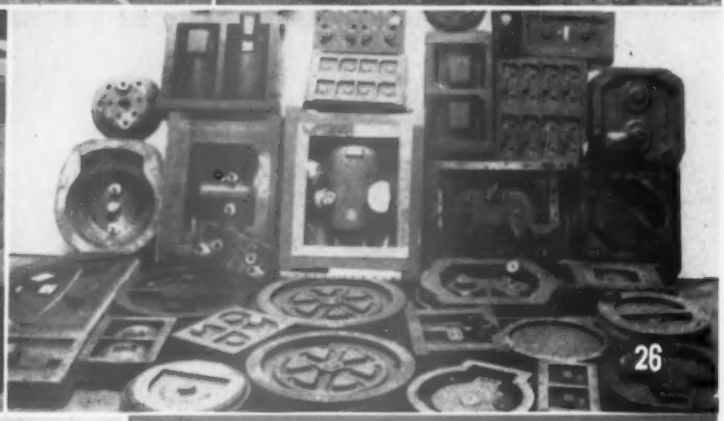
4. Keeping gate or runners full at all times. The gate area should equal the area of the down gate. If the runner is too large, the gate is likely to scab. If the runner is too small, a squirting action causes erosion of mold and core surfaces.

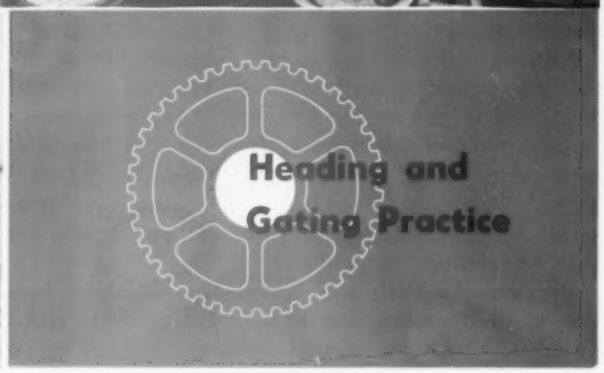
5. Using a half-round-shaped gate to allow harder and easier ramming.

6. Setting up all patterns in our own pattern shop, including even the short-run jobs. This cuts to a minimum the human element in the molding department. To assist the pattern shop in controlling the high cost of this practice, we use a flexible rubber material for gates. It is made up for us and sold









by us in seven different sizes from ½ to 2½ in. half-rounds.

A 12-in. valve body weighing 3807 lb gross is shown in Fig. 11. A 2-in. down gate was used with two runners 2 in. half-round. Note flat cope surface. Fig. 12 shows a welding flange casting with the riser attached internally. With this the machined flange face is cast down and the casting poured up hill.

The small valve body shown in Fig. 13 illustrates a method which thoroughly feeds the flanges and seats and results in a quality casting. Note gating into riser. Almost the same method but on a larger scale is shown in Fig. 14.

Yield—A 66 per cent yield was obtained in casting the flanged spool fitting illustrated in Figs. 15 and 16. An internal riser was used. A low, flat riser does an excellent feeding job and results in a good yield, as shown in Figs. 17 and 18. Fig. 19 also shows a low, flat riser with two castings per head. An internal riser again is employed for the slip casting (Fig. 20) used in oil well drilling. Another low, flat riser was used on the small valve body shown in Fig. 21.

Cost—For many years we made our own down-gate cores and pouring cups. Usually we obtained good down gates, properly coated and baked. Occasionally we had a few that were not too sound, and sometimes the coating did not cover the inside completely or was too thick. When we tried a combination refractory pouring cup and down gate the results were very satisfactory (see Figs. 22, 23, 24 and 25).

Fig. 26 shows an array of various shapes and sizes of Washburn or knock-off coreboxes. All cores produced from these boxes are produced on a core blower. Fig. 27 shows a furnace test spoon which is a half pattern—one pattern board, instead of two, and using only six patterns to make 12 castings.

A pattern received from one of our customers was set up for snap molding. Since we do not follow this molding practice, use of our smallest flasks would have resulted in high costs. So the pattern was removed from the snap board and a corebox was built around each half. From these boxes knock-off cores were produced. They were fitted together and stacked with one riser feeding four wheels (see Figs. 28 and 29).

Figs. 30 and 31 show eight castings per mold when originally there were only four. This setup doubled production with only a slight increase in man-hours in the coreroom and molding department.

Navy Modernizes Foundries

By EDWIN BREMER
Metallurgical Editor
THE FOUNDRY

FOUNDRIES of the U. S. Naval Gun Factory, Washington, operate under several contrasting conditions. In part, they are jobbing shops producing a wide variety of repair castings to replace those worn out in service, and to some extent they function as production foundries making sizable quantities of repetitive castings for the Navy. The foundries also perform considerable pilot work in developing satisfactory molding procedures for complicated castings proposed by Navy designers.

Although the foundries are one of the arms of the government, they do not receive preferential treatment in orders for castings. They must compete against commercial industry in quality and be able to produce at a price as low or lower to obtain the order. This holds even though all the development work was conducted in the foundry and made available to prospective bidders.

Previous to 1940 the Naval Gun Factory foundries were operating on a peacetime basis, and because they were dependent upon appropriations from the Congress for modernization to establish them on an equal basis with their commercial counterparts, they were somewhat neglected. However, during the World War when funds became available, the foundries were handicapped by difficulties in securing necessary equipment—a common ailment at that time. Despite this, they operated on a three-shift basis and received numerous citations for their war efforts.

As a result of their wartime accomplishments under those disadvantages, decision was made to embark on a modernization program for both the nonferrous and ferrous foundries. This will permit them to go into high gear should any national emergency arise—and to carry the load while commercial foundries are converting.

While as yet the programs are not fully completed, they are sufficiently developed to merit description. To simplify matters the nonferrous foundry will be described first. It is located in a brick and steel sash-construction building 300 ft long and 115 ft wide which is divided into three bays—37, 53 and 25 ft wide respectively. The melting units, a special molding unit, and pit-type electric furnaces for heat treating aluminum alloy castings are located in the 37-ft bay. Core department and molding machines for small and medium-size castings are located in the 25-ft bay. Roller conveyor units extend from the molding machines to approximately the center of the 53-ft bay, which also contains the floors for medium-heavy and heavy molding as well as shakeout and sand conditioning equipment at one end, and core ovens at the other. General arrangement of the foundry is shown in the accompanying sketch.

As may be observed, the melting equipment consists of one 2000-lb capacity rotating, indirect-arc electric furnace located near one end of the 37-ft bay, and 24 gas-fired, pit-type crucible furnaces arranged in two batteries of 12 each along the wall. Near the other end of the bay are two pit-type electric heat-treating furnaces with a circular quench tank between them. These furnaces are employed primarily for heat treating aluminum alloy castings.

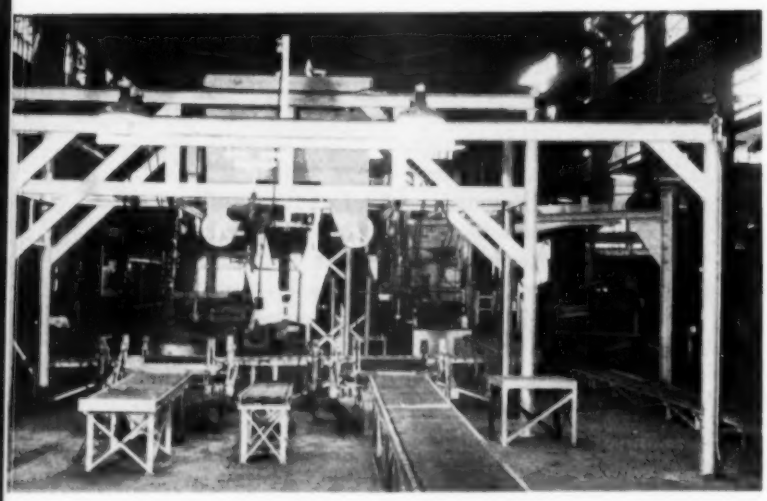


Fig. 1—Miniature bomb molding unit. Drags roll out on conveyor at right center while copes are pushed onto conveyor at left and moved by hoist to drag line for closing. Pouring conveyor is at far right

Fig. 2 (Upper right)—Looking down the foundry in the medium floor molding section. Sand storage hoppers at right. Ends of conveyors from machine molding section are at upper left. Fig. 3 (Lower right)—Molding station end of the machine section. Some bench molding is done at right background

Fig. 4—Partial view of the gas-fired, pit type crucible furnaces. Transformer room for indirect-arc furnace is located in the background

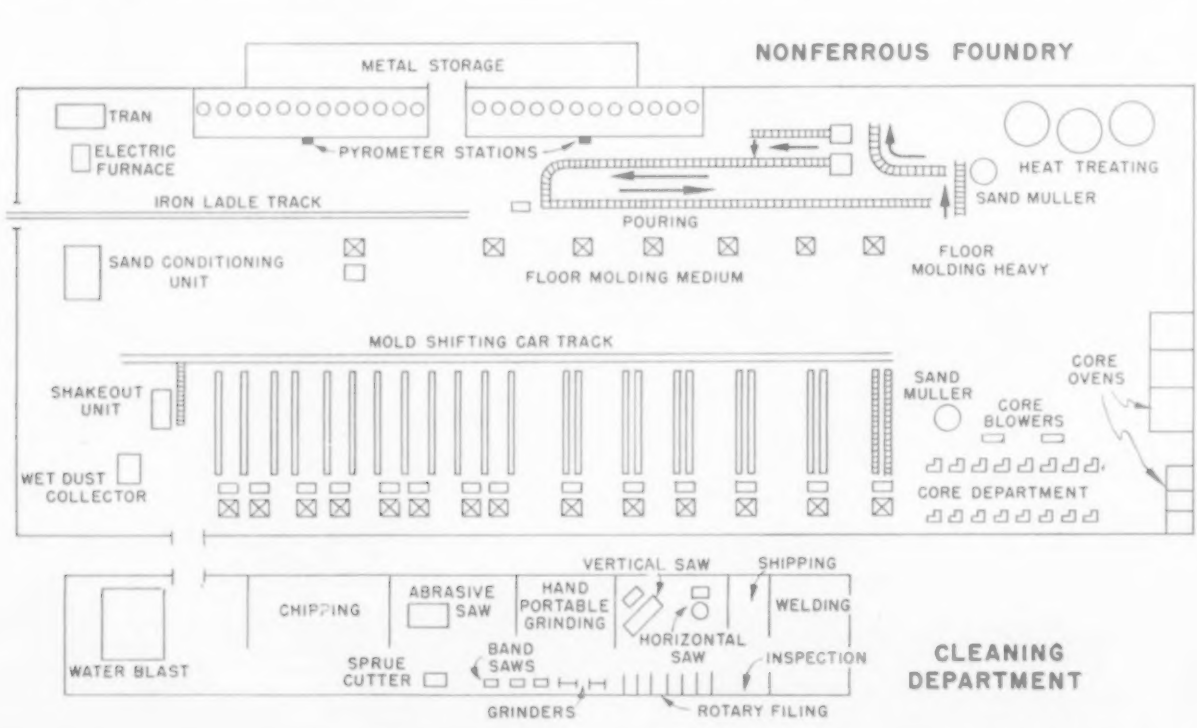
but as occasion demands are used for heat treating aluminum bronze, and stress relieving other types of nonferrous castings. A wide variety of copper-base and aluminum-base alloys, as well as pure copper, are melted in the foundry, which must meet Navy specifications as to composition and physical and mechanical properties.

Molding department, occupying the major portion of the center or 53-ft bay, broadly is divided into two sections, hand molding and machine molding. As indicated on the sketch, the hand molding along one side of the bay mainly is devoted to heavy and medium-heavy work, but may include smaller castings of the one-off type, loose pattern work, short run work, special jobs or development work to determine suitable gating and risering systems. This section of the molding department contains seven elevated storage hoppers for molding sand, and one floor is equipped with a large jolt-rollover molding machine.

Machine molding section on the opposite side has 14 molding stations with overhead storage hoppers. Three stations are devoted to bench molding, the remainder to machine molding. Molding machines include jolt-squeeze and jolt-rollover types. The latter are arranged in pairs for cope and drag operation. Each molding station is equipped with gravity-type roller conveyors for transporting molds from the station toward the center of the bay, and the empty flasks from that point back to that station. In the case of the cope and drag operation three roller conveyors are used; two for returning flasks to the respective machines, and one in the center common to both machines for transporting completed molds.

Molds are poured near one end of the conveyors and, after the metal has solidified, the molds are pushed off onto a mold shifting or transfer car, which carries them to the shakeout station at one end of the bay. The transfer car, which is motor driven, is equipped with three short sections of roller conveyor mounted at the same height as those from the molding stations so that it is an easy matter to move molds and flasks from one to the other. When the molds arrive at the shakeout station they are pushed off onto a short section of roller conveyor extending across the front of a 5 x 8-ft vibrating screen shakeout unit. Molds are hoisted from the conveyor onto the screen and, after the sand is shaken out, the flasks are returned to the car, which distributes them to the proper station. Castings are placed in tote boxes on a car and transported to the cleaning department located in a separate building nearby.

Shakeout unit is equipped with back and top exhaust hoods which, in turn, are connected to a wet-type collector close by. This arrangement effectively removes any dust arising from the shakeout unit. The dust collector also (*Please turn to page* 310)



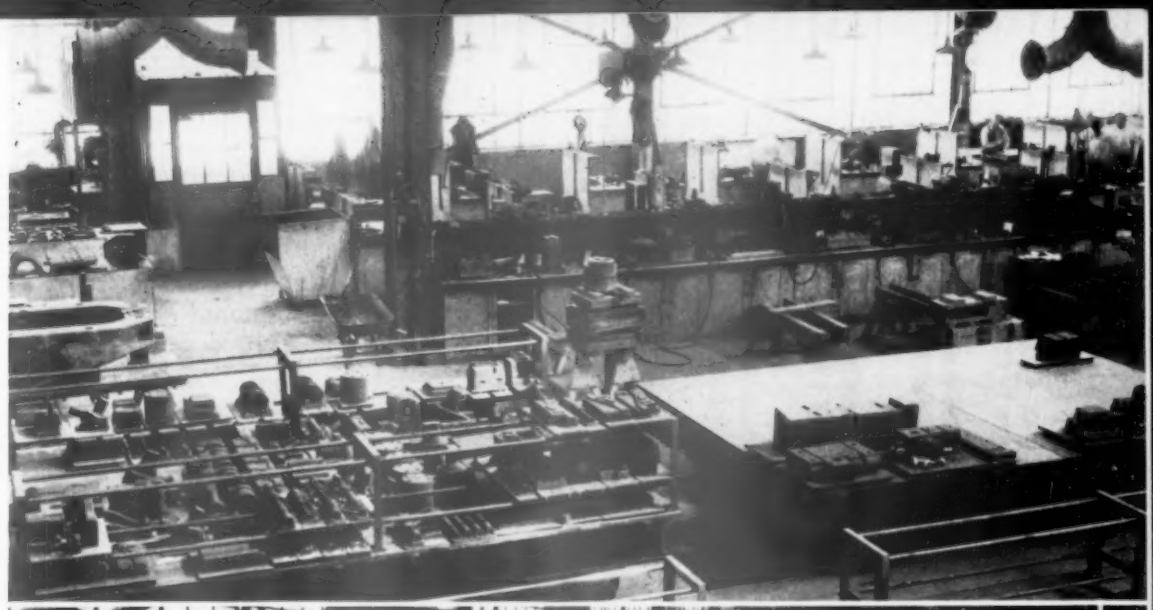


Fig. 5—Cores in a wide variety of shapes and sizes are produced on the bench, on the floor, and on core blowing machines, and placed on cars to be run into drying ovens

Fig. 6—Close-up of bench molding units in the coremaking department. Adequate lighting is supplied by the windows, supplemented by electric illumination when required

Fig. 7—View from one end of the nonferrous cleaning department showing the wet blasting unit in background. Rotary filing, sprue cutting, and bandsaw equipment are along the left wall

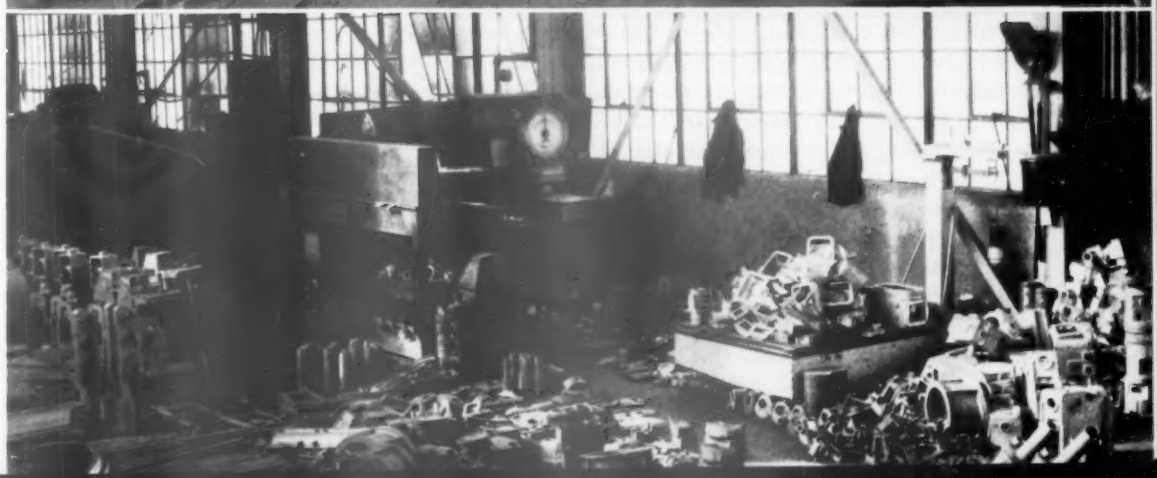


Fig. 8—The wide variety of nonferrous castings produced is illustrated by this assembly of small and medium size castings in one section of the cleaning department

The author describes a method for evaluating the effect of oxidation of cupola metal on graphitization, and points out how the malleable foundry can alleviate some of its troubles with castability and annealing. This paper was presented at the third annual Ohio Regional Foundry Conference at Cincinnati, Mar. 10

Effect of Oxidation in Cupola Melting on

Annealability of Malleable Iron

By MILTON TILLEY
Metallurgist
National Malleable & Steel Castings Co.
Cleveland

MALLEABLE iron metallurgists have the tendency to anesthetize themselves with the idea that oxides and/or the effect of oxidation in their metal is of no consequence because of the presence of a high percentage of carbon and silicon.

In recent years this phase has come under closer scrutiny, particularly with respect to the effect on graphitization.

Every metallurgist, I suspect, has heard about the "old timers" experiencing periods when the metal became progressively harder to handle both as to castability and annealability. No matter what they did, misruns, shrinks and hot tears were out of control and the annealing rejections were high due to pearlite. When the condition became intolerable they eliminated the returns from the charge, substituted bought scrap and used a high percentage of pig iron, thereby making a heat of so-called "virgin metal."

Likewise, they have heard of operators who, when the melting operations got out of control so that a heat became badly oxidized, would add a small quantity of aluminum.

Metallurgists, industry wide, have the experience of a particular heat giving trouble in the foundry and annealing, or, in the case of continuous melting, one period during the day resulting in increased foundry losses due to misruns, shrinks and hot tears and annealing rejections due to pearlite.

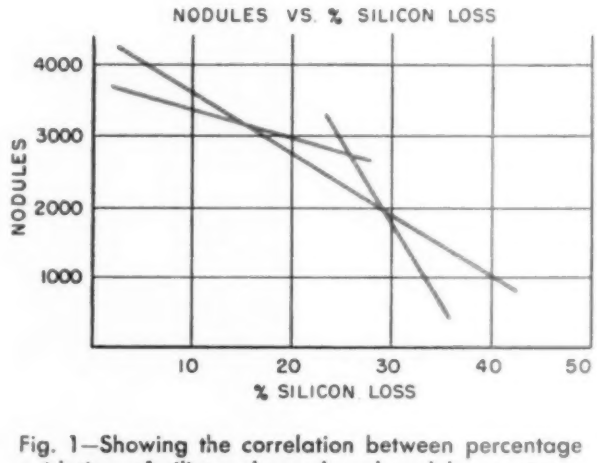
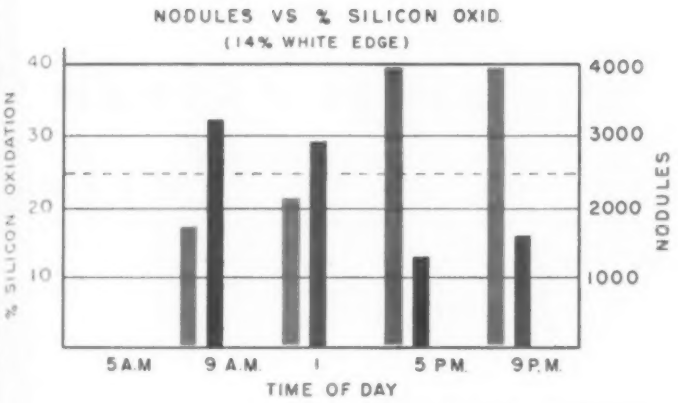


Fig. 1—Showing the correlation between percentage oxidation of silicon charged and nodule count per cubic millimeter in the resultant iron produced in a cupola-air furnace duplex unit

In a large percentage of such cases the trouble was a result of excessive oxidation during melting. Obviously, the same condition can be arrived at by introducing a large percentage of excessively scaled scrap.

It is well known that excessively oxidized metal



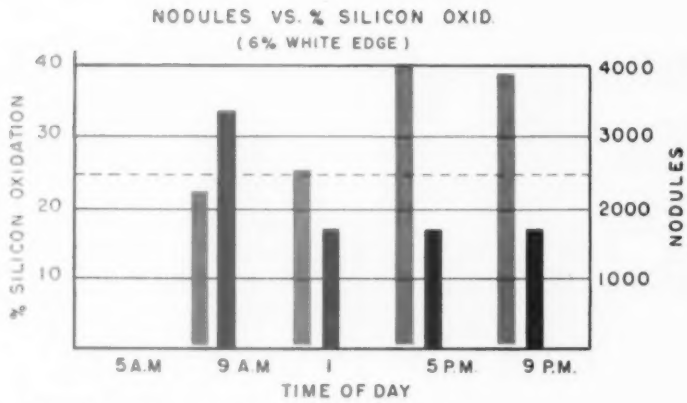
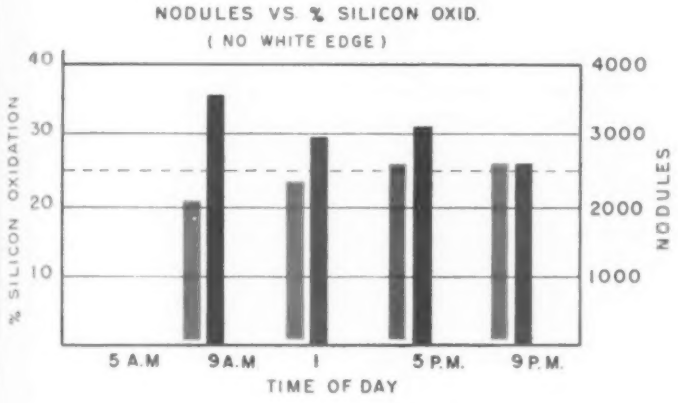
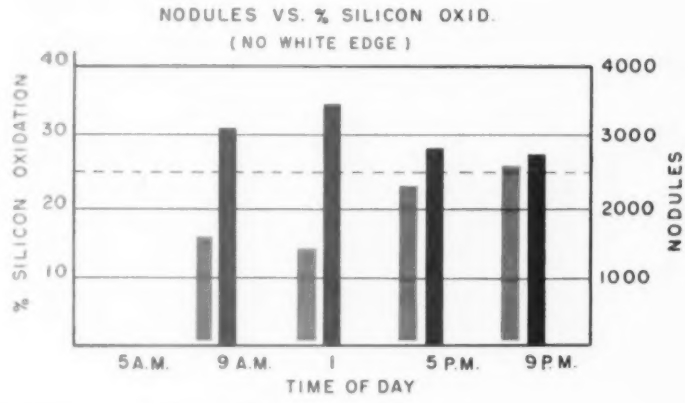


Fig. 2 (left)—Relationship between oxidation and nodule count when 14 per cent casting rejection was indicated by white edges on test lugs. Fig. 3 (right)—Bridging over of cupola at 4 p. m. produced severe oxidizing condition





Figs. 4 and 5—With oxidation maintained at 25 per cent or less, nodule count is normal and no casting rejections after anneal were encountered

freezes at a higher temperature than normal metal, resulting in increased misrun loss. Also that it shrinks more and therefore results in more hot tears. However, it is not so well known how to evaluate the severity of oxidation with respect to graphitization rates. A partial answer, and it well may be a complete one, is that the number of graphite nodules is reduced with increasing percentages of oxidation, especially when the rate of oxidation exceeds the established normal.

It has been demonstrated by Schwartz and others that the distance between nodules through which the carbon travels in the graphitizing process, is one measure of graphitization rate.

Fig. 1 shows the correlation between percentage oxidation of the silicon charged and the nodule count per cubic millimeter in the resultant iron as manufactured in the cupola—air furnace duplex unit in our plant. The long line of regression represents the correlation of all the data.

By visual inspection it appeared that there was a possibility of two universes, one below 26 per cent oxidation and one above 25 per cent. Accordingly, regression lines were calculated for each with the result shown, and they suggest that the true line may be curvilinear with increasing effect upon increasing percentage of oxidation—particularly above 25 per cent, which is normal for our melting unit. Our normal nodule count is 2500, and by inspection it is seen that the regression line passes near this point.

The illuminating information derived is that it requires but 6 or 7 per cent oxidation of the silicon charges over normal to reduce the average nodule count by one-half, which in turn reduces the graphitization rate to an alarming extent. At 35 per cent oxidation of silicon charged the nodules are reduced to the point where the time required to break up the last of the pearlite is longer than commercially economical as a standard.

The data were obtained by calculating the silicon loss from the amount in the charge and the analysis of the air furnace iron at the time the test piece was poured. All test pieces, designed to duplicate the ASTM test bar in as-cast cooling rate, were annealed in a closely controlled laboratory furnace using the same heat cycle and controlled atmosphere. Seventy-two samples were acquired over a period of ten months.

To illustrate the relation, Figs. 2, 3, 4 and 5 are presented where the effect of oxidation on the nodule count on daily test bars, poured at 9 a.m., 1 p.m., 5 p.m. and 9 p.m., is depicted for those particular days. The column on the left shows the calculated oxidation rate and that on (*Please turn to page* 313)

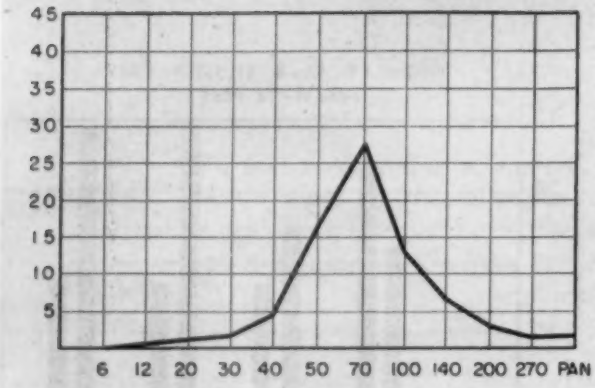


Fig. 2—Screen analysis for sand shown in Table I

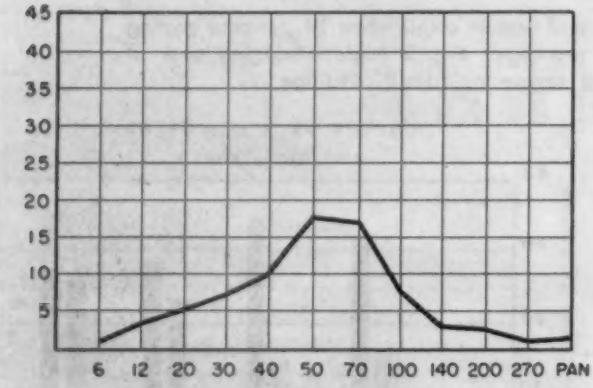


Fig. 3—Screen analysis for the naturally bonded sand listed in Table II

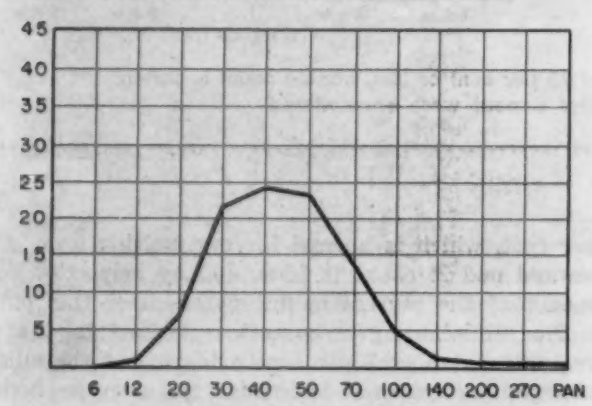


Fig. 4—Screen analysis for the crude silica sand shown in Table II

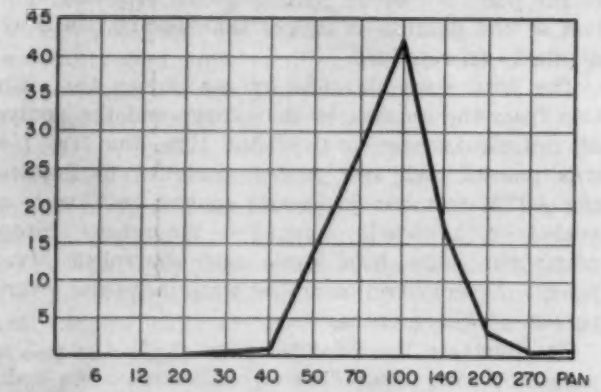


Fig. 5—Screen analysis for the washed and dried silica sand shown in Table II

STEEL FOUNDRY

Core

In this second of a series of five articles, the author discusses grain shape and distribution, chemical composition and refractoriness of steel foundry sands. The effects of variations in these properities on castings produced also are described

By JOHN HOWE HALL
Consultant
Swarthmore, Pa.

Table I—Amount of Sample Retained

U. S. Series Equiv. No.	Grams	Per Cent	Multiplier	Product
6	0	0	3	0
12	.2	.4	5	2
20	.6	1.2	10	12
30	.9	1.8	20	36
40	2.8	5.6	30	168
50	8.6	17.2	40	688
70	14.1	28.2	50	1410
100	6.6	13.2	70	924
140	3.2	6.4	100	640
200	1.6	3.2	140	448
270	0.5	1.0	200	200
Pan	1.0	2.0	300	600
Total grain	40.1	80.2		
AFS clay	9.9	19.8		
Total sample	50.0	100.0		5128

AFS grain fineness = 5128 ÷ 80.2 = 64

Table II—Per Cent Retained

U. S. Series Equiv. No.	Naturally Bonded Sand	Crude Silica Sand	Washed and Dried Sand
6	1.1	0	0
12	3.9	0.4	0
20	10.3	7.8	Trace
30	7.6	22.2	Trace
40	12.1	24.8	0.6
50	18.4	23.6	6.8
70	18.0	13.8	27.2
100	8.0	5.2	43.6
140	2.4	1.0	17.2
200	1.2	0.2	3.0
270	0.3	Trace	0.6
Pan	1.0	Trace	0.6
Total grain	84.3	99.0	99.6
AFS clay	15.7	1.0	0.4
AFS grain fineness No.	40	34	72

and Molding Sands

AT FIRST glance it might be thought that high temperature tests would accurately determine at least certain aspects of the behavior of sand mixtures when exposed to molten steel. Thus "shock" tests might be expected to tell whether or not a given facing mixture will spall off and produce lumps, dirty spots and scabs on the castings. The expansion test also should give some indication as to how the sand would behave in this respect. To a certain extent this is the case, but as the test is carried out on small samples of either the facing or the backing sand, it tells only how each of them acts individually and by itself, and not how a mold made up of varying proportions of both will behave. Spalling and sloughing off of the mold surface is thought to be due at least in part to the sudden generation and expansion of gas in the sand.

The shock test indicates whether the facing sand in a small test piece will vent off the gas fast enough to minimize spalling. It cannot, however, show accurately whether in a mold made with a certain thickness of facing sand and a backing sand of high permeability, the gases will escape freely enough to prevent spalling and sloughing off. Nor can the expansion test be expected to give more than a very general idea of how the sand will behave in this respect.

Hot compressive strength is even more difficult to interpret. To some extent it indicates how much ferrostatic pressure the sand can resist, and thus whether or not the mold will tend to swell. Resistance of the sand to contraction of the solidified steel is also dependent upon its strength when hot. Were the entire mold—or at least the sand to a considerable distance from the casting face—heated to the same temperature, the hot strength would give a definite indication of how the sand will resist swelling and how much or little it will resist the casting's contraction.

As molding sand is an excellent insulating material, however, there is a rapid decrease in the temperature to which it is heated at different distances away from the casting face. When light sections of steel are cast, only a very thin layer of sand is highly heated, and at a short distance from the casting the mold is at a comparatively low temperature. Heavier masses of steel, which remain molten longer and cool more slowly, bring the sand to high temperatures to much greater distances from the face of the casting. The temperature at which the steel is poured also influences the depth to which the sand is heated, but its effect is not as great as that of the sections of the casting, particularly those which are heavy.

Therefore, no definite and complete answer exists to the question of what temperature to use in determining hot strength, or how long the specimen should be kept at the selected temperature before the load is applied. At best, the temperature and exposure time chosen must be a compromise, and the test results must be interpreted merely as general indications of what may be expected to happen in the mold.

In ascertaining the extent the sand near the gate will be cut and washed by the flowing stream of metal, high-temperature tests give even less definite information. There is no way to subject the test piece in the furnace to the exact conditions that exist at and near the gate, or even to similar conditions. Naturally, tests that show only how the sand responds to suddenly applied heat, and its strength at various high temperatures, will not tell definitely to what extent it will give way under the erosive action of the flowing metal.

Grain Shape and Distribution—Shape of the individual grains of sand depends primarily upon the extent to which the material has been worn by the action of the water and winds that transported it. Some sands are composed of thoroughly rounded grains. When magnified, they look like the smooth pebbles used in certain types of grinding mills. Other sand grains are of irregular an- (*Please turn to Page* 273)

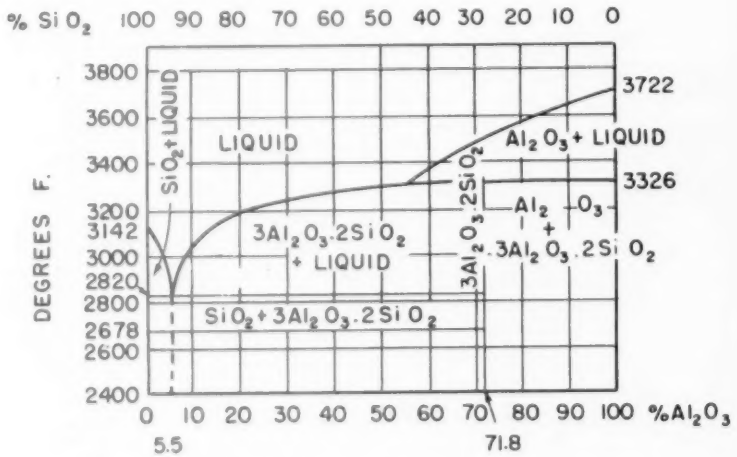


Fig. 6—Equilibrium diagram of the system $Al_2O_3.SiO_2$ (Bowen and Grieg). Taken from "Refractories of the Alumina-Silica Series," Fred A. Harvey, *Transactions*, Electrochemical Society, 1939, p. 99. Hansen published same diagram with °C in *Transactions*, AFS, 1926, p. 346

QUESTIONS and A

Using Petroleum Coke As Fuel

Q.—We shall appreciate information on petroleum coke as a cupola fuel. Is it as good as coke made from bituminous coal by either the beehive or by-product process? Has it any injurious properties that might affect castings made from cupola melted metal?

A.—Answering the first question, in some respects petroleum coke is better than coke made by either the beehive oven or by-product method. Answer to the second question is a qualified no. Petroleum coke has no injurious properties that may be transmitted to the castings except that it may be high in sulphur. The coke is a residue from the distillation of crude oil. It is used to some extent, either by itself or as part of the ordinary coke split, in cupola operation where extremely high temperature is necessary —for example, where steel scrap forms the greater part of the metal charge. The coke is almost as porous as charcoal, burns remarkably free and with intense heat. A low ash and high carbon content makes it a very desirable fuel where a supply is available, and where the cost is not too high in comparison with regular coke.

Ingot Molds Molded Vertically

Q.—We shall appreciate information on the foundry practice for making ingot mold castings in the United States. Our molds vary in size up to 20-in. square.

A.—With one notable exception, molds and cores for ingot molds are made in a pit approximately 6 ft deep. From an adjacent sand supply one man shovels sand into either flask or corebox, while a second man, standing on a plank straddling the pit, rams the sand with a long pneumatic rammer suspended from a pulley, and with a counterweight at the free end of the rope. Usual thickness of sand between pattern and flask is 2 in. Thickness of sand around the cast iron core arbor may be slightly less.

In one type of rigging the core arbor is a one-piece casting. In a second type the arbor is in four sections. By releasing a catch the arbor collapses to facilitate removal of the core from the casting at the shakeout. Molds and cores are dried in an oven. Metal is poured into a basin at the top, flowing through a long sprue and entering the mold through a gate at the bottom. Probably in the majority of instances the mold is not provided with a cope. The steel lifting loops are suspended from a rod with the ends resting on top of the mold. A complete description of the process in a prominent Eastern foundry was presented in the April, 1946 issue of THE FOUNDRY.

The exception noted in the first sentence applies to the practice in one plant where the molds are made in a horizontal position from a split pattern mounted on a large jolt-rollover machine. After the half-molds are dried they are assembled and set up in a vertical position in long parallel rows in a pit where they are filled with metal. The circular casting is plain on the outside, but is corrugated or fluted on the inside. Cores are made horizontally in the core-room from sharp or silica sand bonded with oil. The half cores are pasted and wired together to form the complete core.

Metal Penetrates Into Cores

Q.—As manufacturers of centrifugal and bore hole turbine pumps in India we produce various sizes of gun metal bushings and impellers in our foundry. Molds are made of ordinary sand varying in grain size between 40 and 200 mesh. For cores we use a special sand sieved between 70 and 100 mesh with linseed oil as the bond. To avoid cold shuts in the castings we have to pour at slightly elevated temperature, and find that we have too much penetration of metal into the sand. Can we avoid that by use of any special paint for both molds and cores, and what should we use?

A.—While you state that the alloy used is gun metal, we wonder if it rather is a phosphor bronze since such an alloy is more fluid, and tends to penetrate between the sand grains. Usual procedure with phosphor bronze is to coat both mold and core with a carbonaceous-base material generally called blacking. That material fills up the pore spaces at the surface and to a large degree prevents metal penetration. Blackings are composed of finely ground carbonaceous material such as graphite, coal, coke, etc., with some type of binder such as clay, molasses, or sulphite liquor to make it adhere to the sand surface. Proprietary blackings are available in dry or paste form ready for addition of water to make them applicable by spraying, brushing or dipping.

Since the cores appear to be made of a sand more open than the molding sand, you might try coating them with a paste made of graphite and core oil which is rubbed well into the surface by hand. After treatment the cores should be dried in the oven. Possibly two coatings may be necessary if penetration is excessive. Again some of the difficulty with the

d Answers

cores might be overcome by including some finer sizes in the mix. One or two per cent iron oxide addition also may be of help.

Using Calcium Silicon in Iron

Q.—In our foundry in Holland we are interested in the use of calcium silicon in the production of gray iron castings. Can you tell us how it influences the structure of gray iron, and about the ensuing chemical and physical properties? How is calcium silicon added, and how much is used?

A.—Calcium-silicon or calcium silicide, as it often is called, contains 28 to 35 per cent Ca, 60 to 65 per cent Si, and the remainder Fe. It is used by licensees of the Meehanite Metal Corp. In cast iron it functions as a deoxidizer, degasifier and graphitizing agent. Addition of calcium-silicon results in little if any change in chemical composition of the iron, but does result in enhanced physical and mechanical properties.

Most effective results are obtained when the raw materials as charged in the cupola will result in an iron over the spout which has a white fracture. Suitable additions of calcium-silicon at the spout to such an iron graphitizes it so that the structure becomes gray. Raw materials charged into the cupola usually contain considerable quantities of steel scrap, producing a relatively low-silicon, low-carbon iron. Amount of calcium-silicon added may vary from 20 to 120 or more ounces per ton of iron, and of course depends upon the original composition of the latter and the section thickness of the casting into which the metal will be poured. Method of control for additions usually is a wedge bar or chill bar, as it often is termed. Depth of chill along the tip is correlated to section thickness of the casting, and additions of calcium-silicon are made to the iron at the spout to obtain the desired chill depth on the bar.

Producing Manganese Steel

Q.—In our foundry in Spain we ordinarily produce high-manganese steel in a 3-ton electric furnace using carbon steel scrap, following the double slag process, and adding finally the ferromanganese necessary to obtain the required composition. Nevertheless, on some occasions for lack of ferromanganese we have produced manganese steel by using scrap steel of the same composition, following the single-slag process with the necessary additions to obtain the exact composition. However, we note that the resulting steels do not have the ductility characteristic of the manganese steel we usually obtain, nor do they have the same shock resistance. We would appreciate your opinion on the cause of those deviations, and on how we may avoid them.

A.—If the manganese steel made in the electric furnace, using all manganese steel scrap as raw material, is inferior in quality to that made from carbon steel scrap and ferromanganese, there must be something wrong with the methods followed, since there have been hundreds of tons of manganese steel made from all scrap in this country with no sign of inferior quality. With no details of the slag additions, etc., it is impossible to say in just what way the practice may be at fault.

However, it should be said that in making the steel from carbon steel scrap and ferromanganese, there is no need to follow the two-slag process and add the ferromanganese at the end of the heat. Usual practice in this country is to charge some of the steel scrap on the bottom of the furnace, then charge the ferromanganese to make the composition about 12 per cent Mn, then the rest of the steel scrap, and melt the whole charge down as fast as possible. There will be some loss of manganese which should be made up by additions of silico-manganese to give the required percentage of manganese, and at the same time bring the silicon content up to the desirable 0.50 per cent or slightly over, without raising the carbon too much.

This practice calls for low-phosphorus steel scrap, but the saving in power, compared with the two-slag process, is so great that it more than balances the extra cost of low-phosphorus scrap and the slight ad-

GANGWAY!

By J. A. PATTERSON

"I don't give a hoot—you keep 'em in your locker until you get off!!"

ditional loss of manganese due to melting it down with the charge instead of adding it to the liquid steel.

Commonly there is enough manganese steel scrap available in the foundry in the form of heads, gates and defective castings, to make it desirable to melt a charge composed of part manganese steel scrap, part low-phosphorus steel scrap and part ferromanganese. When that practice is followed part of the manganese steel scrap is charged first, then the required ferromanganese, then the rest of the manganese steel scrap, then the carbon steel scrap, and the whole is melted down rapidly with additions of lime to form the slag. The melt is analyzed for carbon and manganese as soon as it is melted, a little coke dust spread on the slag to reduce some of its manganese oxide content, final additions of silico-manmangese made to give some 13 per cent Mn and 0.50 to 0.70 per cent Si in the steel, and the metal tapped into a ladle. Commonly it does not pay to reduce the slag very much as the extra power required costs more than the manganese left in the slag.

All of this, of course, must be carried out in a basic-lined furnace, which you are using since you speak of the double-slag process. By following this practice the scrap made on each heat is cleaned up, the manganese in it recovered in large part, and a good grade of steel is produced. It is desirable to restrict the proportions of manganese steel scrap in day-to-day use of this method to some 40 per cent of the charge. Most producers in this country, however, buy scrap castings of that composition to increase the proportion of scrap remelted over what it would be if they used only the heads, gates and defective castings from previous heats. Phosphorus in manganese steel need not be too sharply restricted since up to 0.10 per cent is perfectly all right.

Cracks Result From Shrinkage

Q.—We are mailing under separate cover for your examination a section cut from a bronze bushing 7 in. OD x 4 in. ID x 17 in. long. You will notice the cracks which appear on the exterior although both inside and outside look perfectly sound before machining. We have encountered the same trouble with other bronze castings; usually circular shape jobs such as large bushings, rings, etc. Can you suggest methods of overcoming the trouble, or another alloy free from such defect?

A.—Study of the bushing sample indicates that the cracks result from shrinkage or rather lack of feeding during solidification contraction. The cracks exhibit the well-known dendritic or pine-tree structure, and along the edges the color is different than that of the main body. The remedy is obvious, of course; insure adequate feeding and you will eliminate the defect in the castings.

You do not mention the method of gating employed, but we suggest that you make the pattern several inches longer than the desired finished length, and pour the bushing in the vertical position; using a ring of small pop gates located midway between inside and outside surfaces. Such a procedure will place the hot metal in the place most needed to insure good feeding. If you pour the bushings in the horizontal position, you might have to go to the arrangement suggested in the February issue, THE FOUNDRY, page 104, using a horn gate and heavy riser. If you gate into the bottom you might be able to overcome the trouble by leaving the top of the bushing open, and filling from the bottom to within a few inches of the top. Then pour the remainder into the top of the bushing. However, some little skill is required to do that without dislodging sand from around the bushing top.

Prevent Burning of Magnesium

Q.—We operate a foundry in Costa Rica, and are interested in obtaining information on the melting of magnesium alloys, especially on the prevention of burning during melting and pouring. Are there any books relating to the subject?

A.—A rather detailed description of various phases of magnesium alloys including castings is contained in *Technology of Magnesium and Its Alloys* by Beck. It is available for $10 through the book department of THE FOUNDRY. At various times articles have appeared in the technical press relating to production of magnesium alloy castings, and if you have the June and July, 1945, issues you might refer to a series of two articles entitled "Magnesium Castings" which described practices in a foundry at Cincinnati.

Burning of the metal during melting usually is prevented through use of a flux placed in the crucible with the raw material. Fluxing material is a mixture of fluorides and chlorides of sodium, calcium, magnesium and potassium. Before pouring that flux is removed and a light coating or dusting of 50-50 boric acid and sulphur is applied. Metal then is taken to the pouring station, and during pouring the pot is dusted from time to time with the mixture.

An addition must be made to molding sands to prevent the reaction between moisture in the sand and the molten magnesium. It may be about 1 per cent boric acid and 1 per cent sulphur, or mixture of ammonium silicofluoride, sulphur and boric acid; or 1 per cent diethylene glycol. Inhibitors such as boric acid and sulphur may be used in cores, or their surfaces sprayed with a solution of ammonium bifluoride just after removing from the oven.

Slag Disposal by Wet Method

Q.—We are interested in obtaining information on the wet trough method of removing slag from our cupolas, and we believe the June, 1931 issue of THE FOUNDRY described one system.

A.—The article you mention describes the use of a pit about 3 ft away from and directly behind the cupola. Pit is 7 x 7 x 7 ft, and a steel bucket 6 x 6 x 6 ft rests therein. The bucket has holes in its sides 6 in. from the bottom. Water runs out and rises around the bucket to flow to the sewer about

(*Concluded on page* 150)

from 4 to 50 tons per hour

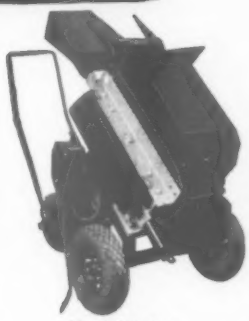
From 4 to 50 tons of properly prepared molding sand per hour — depending upon the size and model you choose. Regardless of the capacity you require —one or a combination of Royers is available to meet the need.

Only Royer Sand Separators and Blenders provide Six Point Sand Conditioning—(1) thorough refuse removal, (2) positive lump breaking, (3) complete blending and mixing, (4) even distribution of moisture, (5) increased permeability, (6) double aeration. The velvety, properly conditioned sand discharged by the Royer makes true-to-pattern molds, cuts discount losses, reduces facing sand requirements and cleaning room costs.

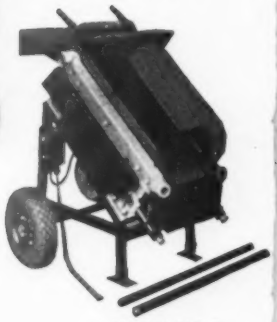
Over 8,000 Royers are now in use in foundries of every kind—large or small — jobbing or production — ferrous or non-ferrous. Available in electric motor, gasoline engine or belt-to-tractor drives. Send for bulletin giving complete information on this cost cutting foundry tool.

Model DPL-FR
40 Tons
per hour

The Junior Royer
4 to 7 tons
per hour

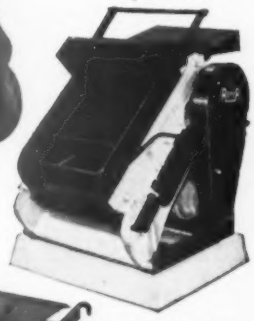


Model NB-4
7 to 9-½ tons
per hour



Model NC-2
12 to 15 tons
per hour

Model NDP
20 to 25 tons
per hour



Model NRS
40 to 50 tons
per hour

Model NDC
Combination
20 to 25 tons
per hour

Model RC
Combination
40 to 50 tons
per hour

ROYER

FOREMOST IN SAND CONDITIONING EQUIPMENT

ROYER FOUNDRY & MACHINE CO.
159 PRINGLE ST., KINGSTON, PA.

QUESTIONS and Answers

(*Concluded from page* 148)

6 in. below the floor level. A stream of water through a ¼-in. pipe under ordinary main pressure runs into the tank continuously. As the slag strikes the water it disintegrates into pieces which will pass through ¼-in. mesh and falls to the bottom. When the buckets are practically full the slag does not break up so finely. Buckets are removed by an air hoist as often as required.

Other installations we have seen use a pit but, instead of a container, employ a small bucket elevator with perforated buckets to raise the granulated slag from the bottom of the pit and discharge it into a container. In another foundry, located on the second floor of the building, which eliminated use of a deep pit, an elongated steel box about 3 ft deep and 10 ft long is used. A screen type conveyor picks up the slag and discharges it into a storage hopper. From the storage hopper the wet material is emptied into auto trucks on the ground floor for disposal. Other foundries use a large pipe about 12 in. in diam through which a rapid stream of water flows. The pipe discharges into a sump for separation of slag and water. Views of such a disposal method are shown in the November, 1949, issue on pages 90 and 91.

Composition Must Be Adjusted

Q.—Can serviceable castings be made from a wrought aluminum alloy containing 4.5 per cent Cu, 0.8 per cent Si, 0.8 per cent Mn? The castings will be heat treated. Also have you any information on suitable test bars?

A.—Whether or not suitable castings can be made from the 4.5 per cent Cu, 0.8 per cent Si, 0.8 per cent Mn aluminum alloy (25S) we believe will depend largely upon the specifications to be met. It is somewhat similar in composition to the No. 195 alloy except for silicon and manganese contents. The No. 195 (ASTM B 26-48T, alloy Cl) calls for 4 to 5 per cent Cu and the following maximum: Fe 1.0 per cent, Si 1.5 per cent, Mn 0.3 per cent, Mg 0.03 per cent, Zn 0.3 per cent and Ti 0.2 per cent. To bring the 25S alloy within those specifications, especially with regard to manganese, it will be necessary to use 35 lb of it with 5 lb 50-50 copper-aluminum and 60 lb pure aluminum. This will reduce the silicon and manganese contents to under 0.3 per cent, and the copper to about 4 per cent.

Test bars usually are made in groups of four to six attached to a single pouring sprue. In one type separate risers are attached to each end of each bar while in another heavy common wedge risers at each end feeds all bars. Important phase is to have the test bars within the dimensional tolerances required, as they are used without machining. Details of the tensile specimen are given in the ASTM specification mantioned previously, and call for a gage length of 2 in. which is 0.5 plus or minus 0.010-in. in diam in the center. Care should be taken to see that the bars are sound—the reason for the heavy risers at each end.

Blast Cleaning Core Plates

Q.—Some time ago we read about cleaning core plates in automotive foundries by blasting with a soft abrasive. We will appreciate further information, especially on why the plates have to be cleaned so energetically. Also is the process used for coreboxes?

A.—The reason the core plates or driers require cleaning by blasting is that during use they tend to become coated with a gummy deposit of oxidized linseed oil. Hence, it must be removed from time to time before the coating builds up to a point where proper support is not provided for the core. Usual procedure is to soak the plates and driers in hot, strong alkalies to remove the hardened or partially hardened oil deposits, and the operation takes considerable time. New procedure of blasting with rice hulls or ground corn cobs removes the deposits quickly at a lower cost.

While use of such blasting may appear drastic, it actually is otherwise as apparently little if any metal is removed by action of the comparatively soft blasting materials. In fact, the method is used to clean airplane engine parts when the engines are torn down for inspection after they have been in use for a specified time. So far as we know, it is not necessary to subject the coreboxes to either of the cleaning methods mentioned. Usual procedure is to blow an adhering sand off with compressed air and wipe with kerosene at the end of the day, or several times a day if necessary. The linseed and other oils in the core sand at those times are unoxidized, and are easily soluble in kerosene.

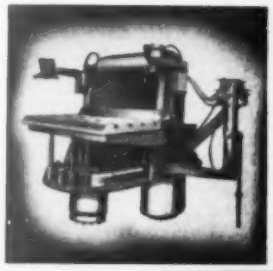
Zirconium Compounds for Molds

Q.—We are interested in using zirconium oxide as a facing and as a mold spray. Can you give us any information on mixtures, etc.?

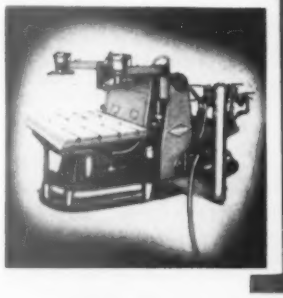
A.—Zirconium compound usually employed for core and mold washes as well as a facing is a mixture of zirconium oxide and silicate, and is available in the form of 325-mesh flour for washes and sprays, and as a sand somewhat coarser, for facing. The flour is mixed with bentonite, core oil and water to form a solution with a Baume gravity of 50° which can be sprayed or brushed on the core or mold. Recommended procedure is to mix thoroughly by hand 70 pt of zircon flour with 5¾ qt bentonite in the dry state. This is added to 50 qt water which is being well agitated with a mechanical mixer or air stream. Then 4¾ qt of core oil is added. Sufficient water up to 70 pt total is added to provide the 50° reading. Mixture should be agitated overnight.

For facing (⅛ to ¼-in. thick) zircon sand is used. It is mixed with 7 per cent binder composed of 6 parts by weight of high grade fireclay and 4 parts bentonite. Moisture content should be about 4 per cent. Facing is applied to pattern or corebox face to obtain the desired thickness, and backed up with regular molding sand.

BLUE RIBBONS



JOLT ROLLOVER DRAW
MODEL A



JOLT ROLLOVER DRAW
MODEL 5A

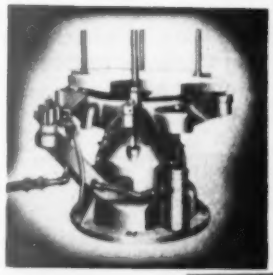
BLUE RIBBONS

You can award yourself a blue ribbon by equipping your foundry with outstanding Davenport Foundry molding machines.

Davenport molding machines not only give you a higher quality uniform casting, but they save you man hours, lower your costs and increase your profits.

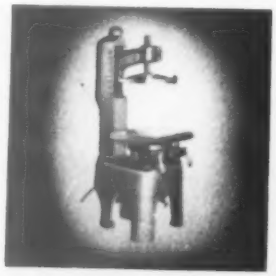
Write today and let us send you our catalog of the Davenport blue ribbon line of foundry molding machines.

"A Mechanized Foundry Benefits Everyone"



JOLT PIN LIFT
MODEL AJS (STATIONARY)

JOLT SQUEEZE
MODEL 10-JX (STATIONARY)



DAVENPORT MACHINE AND *Foundry Company*

DAVENPORT IOWA U. S. A.

REPRESENTATIVES
CANADA: Canadian Foundry Supplies & Equip. Ltd. Toronto and Montreal
FRANCE * BELGIUM * LUXEMBURG * SWITZERLAND
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R. K. Price Associates, Inc. 70 Pine St., New York 5, New York, U. S. A.

MEN of Industry

RALPH G. SWEENEY has been named president, Allyne-Ryan Foundry Co., Cleveland, succeeding the late Frederick D. Ryan. Mr. Sweeney joined the company in 1916 and returned to its employ following military service in World War I. He served in various departments of the foundry and laboratory, became purchasing agent in 1927 and treasurer in 1946. Simultaneously he was a partner in Gerding & Sweeney, industrial truck maintenance and contract trucking operations, becoming proprietor in 1942 upon the death of his partner. Mr. Sweeney is a member of the Northeastern Ohio Chapter of the American Foundrymen's Society.

♦ ♦ ♦

Carl W. Schaffner, formerly manager, Spencer-Heater Division, Williamsport, Pa., division of Avco Mfg. Corp., New York, has been appointed superintendent of gray and white iron foundries, Sprout Waldron & Co. Inc., Muncy, Pa.

♦ ♦ ♦

Herman P. Rassbach, formerly works manager, the Midvale Co., Philadelphia, has been appointed metallurgical engineer with the development group, Electro-Metallurgical Division, Union Carbide & Carbon Corp., New York, with headquarters in Chicago. Mr. Rassbach was graduated from Carnegie Institute of Technology, and has had extensive experience in open-hearth and electric-melting practice, including production of all grades of carbon and alloy steels. He has been associated with Midvale Co. the last 24 years and served as superintendent of the melting and forge department there prior to becoming works manager.

♦ ♦ ♦

Walter Bonsack has been appointed vice president-director of research, Christiansen Corp., with headquarters at Chicago, where he will be in charge of technical operations and procedures of all plants. Mr. Bonsack, who was born in Berlin, Germany, studied and taught metallurgy there prior to coming to the United States in 1927. Since then he has held a top position in the metallurgical and research fields here. He is a member of the executive committees of numerous technical societies and has served as chairman of the Aluminum and Magnesium Division, American Foundrymen's Society. He holds patents in this country and abroad on aluminum alloys, heat treating, fluxes and fluxing processes, special type melting furnaces and refining methods.

♦ ♦ ♦

Herbert E. Cragin Jr., formerly foundry manager, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., has been named assistant to the president, in charge of engineering research and development. In addition he will assist the sales department in handling matters requiring technical engineering assistance. **Erwin H. Mebs** succeeds Mr. Cragin as plant manager of the foundry. A graduate of Ohio State University, Mr. Mebs has a degree in science from University of Alabama. He was previously associated with Machined Steel Casting Co., Alliance, O., Carnegie-Illinois Steel Corp., Johnstown, Pa., and Ohio Steel Foundry Co., Lima, O.

♦ ♦ ♦

Robert E. Cope has been appointed general manager of the permanent molding division recently expanded by Michigan Wheel Co., Grand Rapids, Mich., to manufacture castings in bronze and aluminum. Mr. Cope, a graduate of University of Michigan, was previously associated with Aluminum Co. of America as product engineer, and with Aluminum Permanent Mold Co., Grand Rapids.

♦ ♦ ♦

Robert H. Brown, chief of chemical metallurgy at the Research Laboratories, Aluminum Co. of America, New Kensington, Pa., has been chosen by the National Association of Corrosion Engineers to receive the Whitney Award for 1950 in recognition of his outstanding contribution to the science of corrosion. Mr. Brown was graduated from Drexel Institute of Technology in 1927 and

(*Continued on page* 154)

RALPH G. SWEENEY

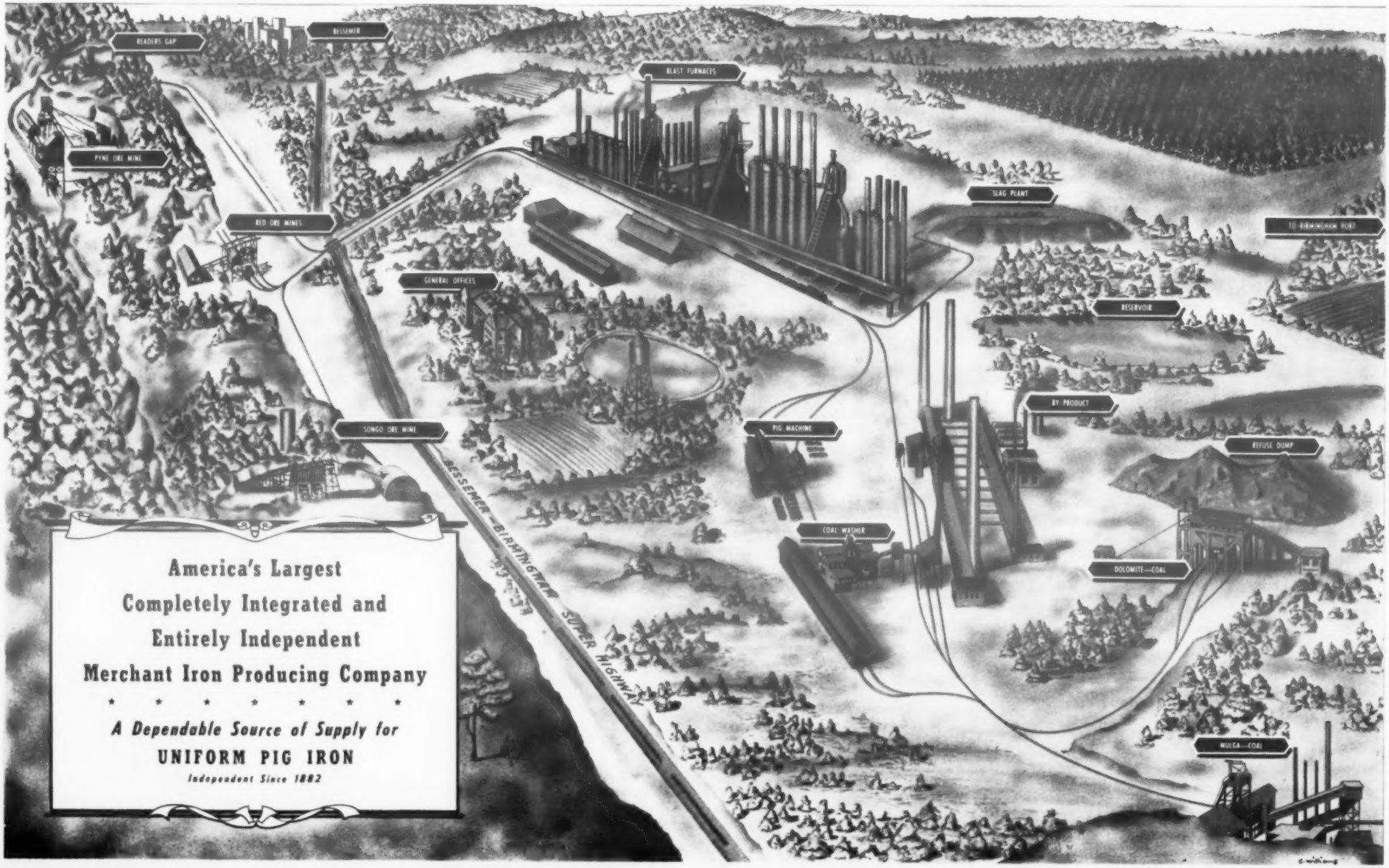
CARL W. SCHAFFNER

HERMAN P. RASSBACH

WALTER BONSACK

Properties of WOODWARD IRON COMPANY

WOODWARD, ALABAMA



MEN of Industry

(*Continued from page* 152)

in 1930 received the master of science degree in chemical engineering at Massachusetts Institute of Technology. He has been associated with Aluminum Research Laboratories since 1931, where he directs research on the chemical behavior of aluminum and magnesium alloys.

♦ ♦ ♦

Robert H. Morse Jr. has been elected president, Fairbanks, Morse & Co., Chicago, succeeding his father. **Col. Robert H. Morse,** president since 1931, who has been named chairman of the board of directors, following 55 years with the company. The new president is the grandson of Charles H. Morse, founder of the company, who was chairman of its board of directors when he died in 1921. Robert H. Morse Jr. joined the company in 1916 at the foundry in Beloit, Wis., and has served in various positions including assistant general sales manager, vice president in charge of sales, and more recently as vice president in charge of operations.

♦ ♦ ♦

E. T. Peterson has been appointed vice president in charge of engineering, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. Mr. Peterson has been associated with the company for 27 years and until his new appointment was chief engineer in the rolling mill department.

♦ ♦ ♦

Dr. Carl E. Swartz, division engineer of the Kellex Corp., New York, has been named chairman of the metals research department, Armour Research Foundation of Illinois Institute of Technology, succeeding **W. E. Mahin,** who recently became director of research at the foundation. Dr. Swartz, who has been in charge of materials research and development at the Kellex applied physics laboratory, Silver Spring, Md., was graduated from University of Illinois, taking master's and doctor's degrees from University of Wisconsin. Prior to joining Kellex Corp. he was chief metallurgist, Cleveland Graphite Bronze Co., Cleveland, for 10 years, and from 1926 to 1935, research metallurgist, American Smelting & Refining Co., Perth Amboy, N. J.

♦ ♦ ♦

Franklin Farrel III has been elected executive vice president, and **Joseph LeMay,** secretary and assistant treasurer, Farrel-Birmingham Co. Inc., Ansonia, Conn. All other officers and directors of the company were re-elected. Mr. Farrel is the fourth generation of the Farrel family in management of the company, founded in 1848. He joined the organization in 1933, following graduation from Yale University, and worked for several years in various departments, becoming foundry manager in 1937. Subsequently he became a director, assistant manager of manufacturing, manager of the Ansonia-Derby plants, and assistant treasurer in 1944. Since 1945 he has been assistant to the president, and secretary of the company. Mr. LeMay started as office boy with Birmingham Iron Foundry, now the Farrel-Birmingham Derby plant, and advanced through various positions in the cost accounting department, becoming controller in 1945. He was named a director in 1947, when he also became general manager of the Atwood Division, which the company operated at Stonington, Conn., and later sold. He has been general controller since 1947.

♦ ♦ ♦

Claude E. Monlux, vice president, the Linde Air Products Co., New York, has been elected president of the International Acetylene Association. **James W. Dunham,** vice president, National Cylinder Gas Co., Chicago, has been named vice president. **E. V. David,** assistant manager of the technical sales division, Air Reduction Sales Co., New York, was re-elected treasurer, and **H. F. Reinhard** was re-elected secretary.

♦ ♦ ♦

J. J. Nolan Jr., Central Foundry Co., Holt, Ala., has been elected president of the Cast Iron Soil Pipe Institute. **George L. Harberger,** Eastern Foundry Co., Boyerstown, Pa., was named vice president; **Deems W. Hallman,** Hajoca Corp., Philadelphia, treasurer; and **Robert Dick,** executive secretary. Directors named at the annual meeting held recently at Las Vegas, Nev., include the following: **J. W. Struve,** Rich Mfg. Co., Los Angeles; **William T. Deyo,** Anniston Foundry Co., Anniston, Ala.; **Michael J. Harvey,** Tyler Pipe & Foundry Co., Tyler, Tex.; **David B. Shannon,** Somerville Iron Works, Somerville, N. J.; **Frank T. Hamilton,** Rudisill Foundry Co., Anniston, Ala.; **Frank Dowd,** Charlotte Pipe & Foundry Co., Charlotte, N. C.; and **Charles A. Hamilton,** Alabama Pipe Co., Anniston, Ala.

♦ ♦ ♦

Carl E. Schultz, head of the Laboratory Equipment Corp., St. Joseph, Mich., has been named a director of Benton Harbor Malleable Industries, Benton Harbor, Mich. All officers and other directors of the company were re-elected.

♦ ♦ ♦

A. J. Willingham Jr. has been named general manager, the Southern Chain & Mfg. Co., recently organized in Birmingham by the Round Associate Chain Companies to distribute the products of its affiliated companies. Mr. Willingham was graduated from Alabama Polytechnic Institute and University of Denver. He

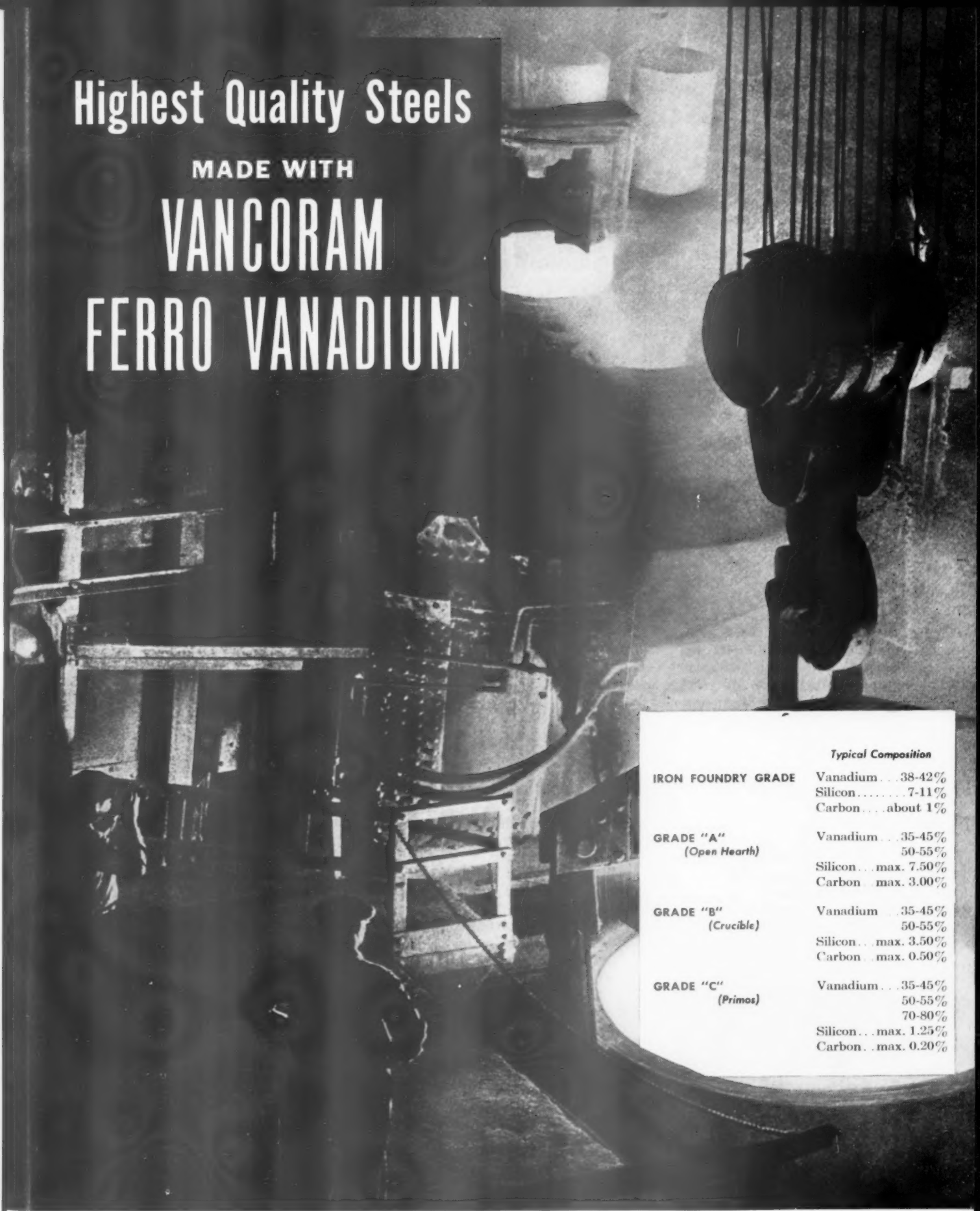
(*Continued on page* 156)

ROBERT H. MORSE

E. T. PETERSON

DR. CARL E. SWARTZ

FRANKLIN FARREL III



	Typical Composition
IRON FOUNDRY GRADE	Vanadium . . . 38-42% Silicon . . . . . 7-11% Carbon . . . . about 1%
GRADE "A" *(Open Hearth)*	Vanadium . . . 35-45% 50-55% Silicon . . . max. 7.50% Carbon . . max. 3.00%
GRADE "B" *(Crucible)*	Vanadium . . 35-45% 50-55% Silicon . . . max. 3.50% Carbon . . max. 0.50%
GRADE "C" *(Primos)*	Vanadium . . . 35-45% 50-55% 70-80% Silicon . . . max. 1.25% Carbon . . max. 0.20%

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

MAKERS OF FERRO-ALLOYS

VANCORAM

CHEMICALS AND METALS

MEN of Industry

(*Continued from page* 154)

was formerly affiliated with U. S. Pipe & Foundry Co., East Burlington, N. J., and Moore-Handley Hardware Co., Birmingham. **Raymond L. Round,** president, and **James W. Dickey,** vice president and treasurer, of all the Round Associate Companies, will serve in like capacities with Southern Chain.

♦ ♦ ♦

Dr. J. G. Pearce, secretary and director of the British Cast Iron Research Association, has been announced recipient of the Order of the British Empire, a signal recognition of the importance now attached to the British iron foundry industry. Dr. Pearce, educated at the University of Birmingham, spent an apprenticeship period with Metropolitan-Vickers Electrical Co. Ltd., later becoming a design engineer. Knowledge gained abroad by visits to France, Belgium, Italy, Switzerland and United States resulted in an invitation to become director of the British Cast Iron Research Association in 1924. Under his guidance the association has become outstanding for promoting research and development in the ferrous foundry industry. He has written many papers and lectured before prominent British and European industrial societies. Dr. Pearce attended the 1948 annual convention of the American Foundrymen's Society in Philadelphia.

♦ ♦ ♦

David E. Davidson has been elected vice president-sales, Link-Belt Co., Chicago, with headquarters at the executive offices there. Mr. Davidson was graduated from Illinois Institute of Technology and joined the company in 1924. He has served as draftsman, sales engineer at Atlanta, district sales engineer at Detroit warehouse, district sales manager at Indianapolis and more recently at the Pershing Road plant, Chicago. **Eugene P. Berg,** formerly assistant general manager there, succeeds him as general manager. Mr. Berg worked in the Pershing Road shop during vacations, while attending Purdue University. Following graduation he has served as supervisor of the methods department there, general foreman of the steel shop, works manager at the Philadelphia plant, and general superintendent and assistant general manager at the Pershing Road plant.

♦ ♦ ♦

George T. Boli has been named president, Northern Malleable Iron Co., St. Paul, succeeding the late Alfred M. Fulton. Other officers of the company include the following: **David R. Evans,** chairman of the board of directors; **Thomas K. Cummins** and **Robert D. Clark,** vice presidents; and **William H. Caldwell,** secretary and treasurer. **Frank J. Berchem** and **Arthur W. Johnson** have been appointed assistant superintendents.

♦ ♦ ♦

John F. Benjamin has been elected a vice president, Warren Foundry & Pipe Corp., Phillipsburg, N. J., and Everett, Mass. Mr. Benjamin will continue as general sales manager of the corporation.

♦ ♦ ♦

Chester W. Schweers, since 1947 manager of the Los Angeles district, Allis-Chalmers, Milwaukee, has been named manager of the New England district, with headquarters in Boston, succeeding **W. F. Taylor** who has resigned. Mr. Schweers, a graduate of Texas Agricultural & Mechanical Engineering College, joined Allis-Chalmers in 1930 and served as a sales engineer in the New Orleans office for nearly 10 years prior to becoming manager of the Houston, Tex., office in 1942. Mr. Taylor, associated with the company since 1926, and **A. B. Frost,** who joined Allis-Chalmers in 1937 and recently resigned as manager of the Boston district, have established their own business.

♦ ♦ ♦

Robert S. Cave has been appointed general sales manager, Severance Tool Industries Inc., Saginaw, Mich. Mr. Cave joined the organization in 1940 as a machine operator, and has served in the lathe and grinding departments, as tooling and field sales engineer, and assistant sales manager. He was associated with Electric Auto-Lite, Bay City, Mich., prior to joining Severance.

♦ ♦ ♦

A. G. Hendrickson has been appointed assistant sales manager of the P&H Welding Division, Harnischfeger Corp., Milwaukee, succeeding **Melvin O. Monsler,** who was recently appointed manager. Mr. Hendrickson, associated with the division for many years, served 5 years as welding engineer in the Milwaukee and Minneapolis districts.

♦ ♦ ♦

E. Emil Svoboda has been appointed foundry superintendent, Marion Casting Co., Marion, O. Mr. Svoboda was formerly foundry foreman, Busch-Sulzer Bros. Diesel Engine Co. Division, Nordberg Mfg. Co., St. Louis.

♦ ♦ ♦

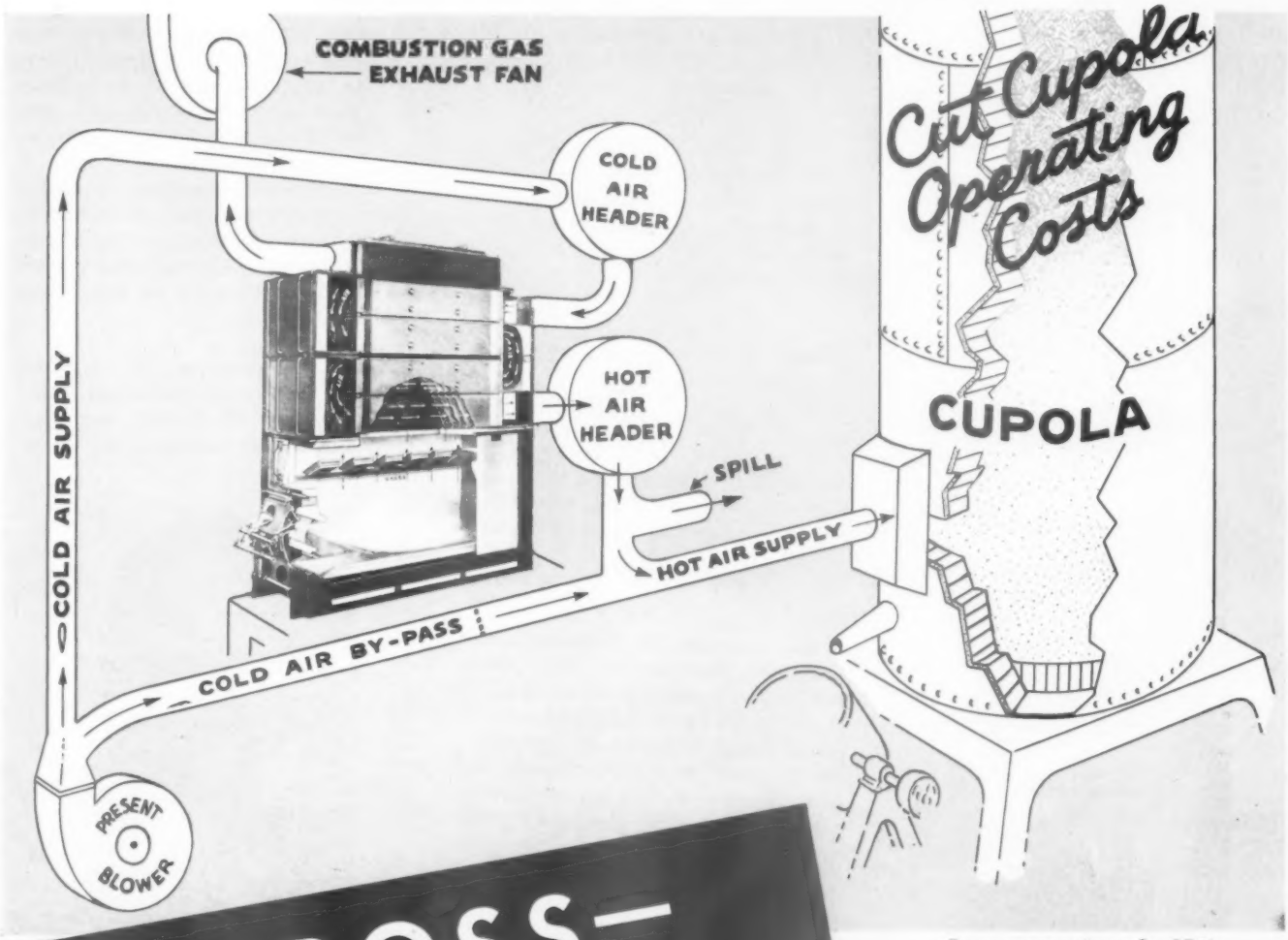
William O. Faxon, for the last two years works manager of the Manchester, N. H., plant, Harrison Abrasive Division of Metals Disinte-

(*Concluded on page* 158)

DR. J. G. PEARCE

EUGENE P. BERG

DAVID E. DAVIDSON



—ROSS— HOT BLAST SYSTEM

Saves approximately 25% of coke.
Eliminates bridging.
Increases melting temperature.
Reduces amount of slag.
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Reduces "pigging" from cold metal.
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As shown by the simplified diagram, ROSS Air Heaters, fueled with oil or gas or both, are located between your existing blower and cupola. Heat from the fuel burned is directly transmitted to the cold air passing through by means of an efficient heat exchanger, raising the temperature of the air to 450 deg. F. for delivery to cupola. The system is designed for your particular operating conditions and can be installed without any interruption to your melting schedule. Get full particulars on this simple, effective system that soon pays for itself out of savings secured.

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ROSS ENGINEERING OF CANADA, LIMITED, MONTREAL 19, CANADA • CARRIER-ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

MEN of Industry

(*Concluded from page* 156)

grating Co. Inc., Elizabeth, N. J., has been named manager of sales of heat-treated shot and grit in New England and the Middle Atlantic states, in addition to his duties in Manchester. He joined the company in 1945.

♦ ♦ ♦

Ronald E. Turner has been appointed sales manager, Queen City Sand & Supply Co., Buffalo, succeeding his father, the late J. Ralph Turner. Mr. Turner, a graduate of Rensselaer Polytechnic Institute, with a degree in metallurgical engineering, will handle sales of silica, molding, core and blast sands, as well as foundry supplies and equipment supplied by the company.

RONALD E. TURNER

♦ ♦ ♦

Don W. Kelsey, materials handling engineer, Union Steel Products Co., Albion, Mich., will attend the British Materials Handling Show, to be held in Manchester, England, June 6-17. Mr. Kelsey, who has been active in the materials handling field for many years, will visit various English plants to compare handling methods, with those in America.

♦ ♦ ♦

O. A. Tucker has been appointed vice president-sales and general administration, Pacific Car & Foundry Co., Renton, Wash. Mr. Tucker was formerly vice president-operations.

♦ ♦ ♦

Russell Jennings has been appointed New England representative, the Wellman Products Co., Cleveland, succeeding the late Norman Maples. Mr. Jennings represents the fourth generation of the family which founded Russell Jennings Mfg. Co., Division of Stanley Tools, Chester, Conn., producers of augers, bits, etc.

♦ ♦ ♦

O. O. Lewis has been named vice president in charge of sales, Fairbanks, Morse & Co., Chicago, and **F. J. Heaslip,** vice president in charge of purchases and traffic. Mr. Lewis, who joined the company in 1908 as a clerk, has served as sales engineer in Indiana, Ohio and Michigan territories. In 1932 he became manager of the Atlanta branch and in 1943 was appointed assistant sales manager in Chicago. He has been sales manager since 1948. Mr. Heaslip joined the company in 1927 as a buyer in the purchasing department, became purchasing agent in 1935 and director of purchases in 1942. Both men are directors of the company.

♦ ♦ ♦

Mrs. Virginia M. Johnson, office manager, Hunt-Spiller Mfg. Corp., Boston, was recently awarded a 25-year gold service pin by the company. Mrs. Johnson joined the company in 1925 as a stenographer, and after serving in various secretarial posts, became office manager 3 years ago.

♦ ♦ ♦

Stuart C. Du Tot has been appointed general manager in charge of sales, Pittsburgh Metallurgical Co. Mr. Du Tot, who has had many years of experience in the ferroalloy industry, will maintain offices in the Oliver building, Pittsburgh, with headquarters at the home office in Niagara Falls, N. Y.

♦ ♦ ♦

Harold A. Hill has been appointed Pittsburgh district manager, Lehigh Foundries Inc., Easton, Pa. Mr. Hill has been associated the last 17 years with Fort Pitt Malleable Iron Co., McKees Rocks, Pa., where he was sales manager and general manager. Prior to that he spent 12 years with Standard Steel Car Co., Butler, Pa., and was associated earlier with American Bridge Co., Ambridge, Pa.

♦ ♦ ♦

A. W. Pollard has joined Aurora Metal Co., Aurora, Ill., as sales engineering representative for aluminum and silicon bronze vacuum die castings, with headquarters in the Case Bldg., 82 St. Paul St., Rochester 4, N. Y. Mr. Pollard's territory includes all of New York state exclusive of New York city.

♦ ♦ ♦

William E. Moody, for the last 7 years abrasive engineer, Bay State Abrasive Products Co., Westboro, Mass., has been appointed manager of sales enigneering. Mr. Moody was chief inspector in the cold-rolled steel section of American Steel & Wire Co., Worcester, Mass., prior to joining Bay State Abrasive Products Co.

♦ ♦ ♦

R. O. Blackford has been appointed sales representative, Buckingham Products Co., Detroit, to handle sale of polishing and buffing compositions and foundry supplies in the Grand Rapids, Mich., district.

♦ ♦ ♦

Paul H. Dunakin, who recently retired as vice president-general manager, *Popular Mechanics* magazine, has been elected executive vice president, Hydro-Blast Corp., Chicago. Mr. Dunakin, a graduate of University of Michigan, served as a trust officer with First National Bank of Chicago for 18 years prior to becoming associated with *Popular Mechanics*. **Ronald Webster** has been appointed sales manager of Hydro-Blast Corp. Mr. Webster was vice president-general manager of the company until 1941 when ill health required him to serve as a consultant only.

PAUL H. DUNAKIN

♦ ♦ ♦

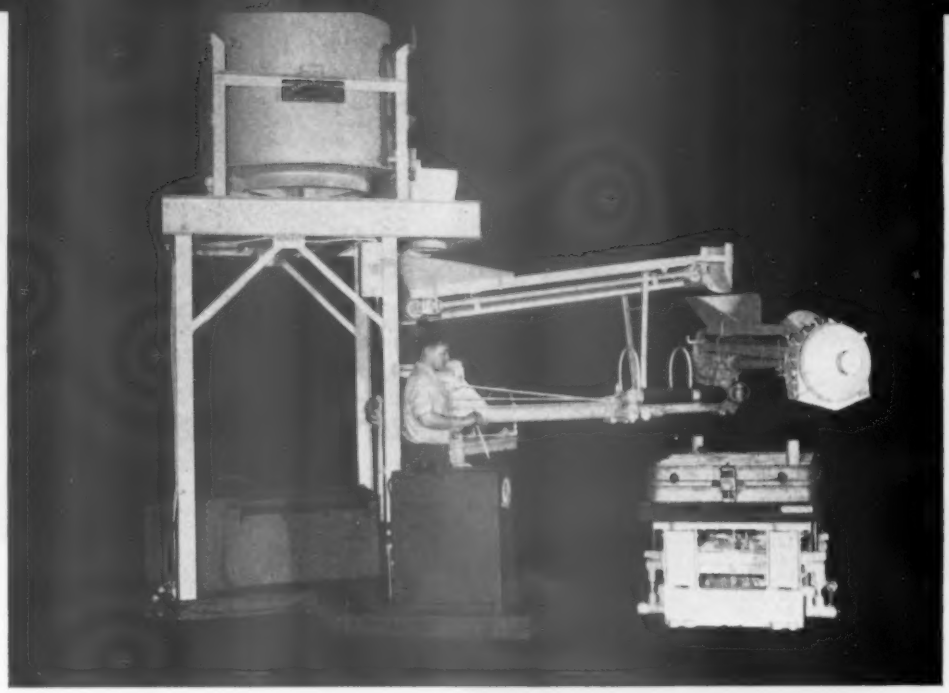
George H. Donaldson has been appointed assistant general manager, the Carbon Limestone Co., Lowellville, O. Mr. Donaldson was vice president-general manager, the Machined Steel Casting Co., Alliance, O., which discontinued operations in March.

♦ ♦ ♦

Horance R. McCoy, until recently chief metallurgist, Ohio Steel Foundry, Lima, O., has been named metallurgist, Texas Electric Steel Casting Co., Houston, Tex.

♦ ♦ ♦

Howard F. Tway has been appointed sales representative, Griffin Wheel Co., Chicago, with headquarters at Kansas City, Mo.



The Hydra-Slinger With B&P Plate Feeder—Ease of operation and accuracy of ramming are assured with this compact, high speed, production unit. The B&P Plate Feeder provides a constant, measured supply of sand to the hydraulically controlled Hydra-Slinger.

BETTER METHODS

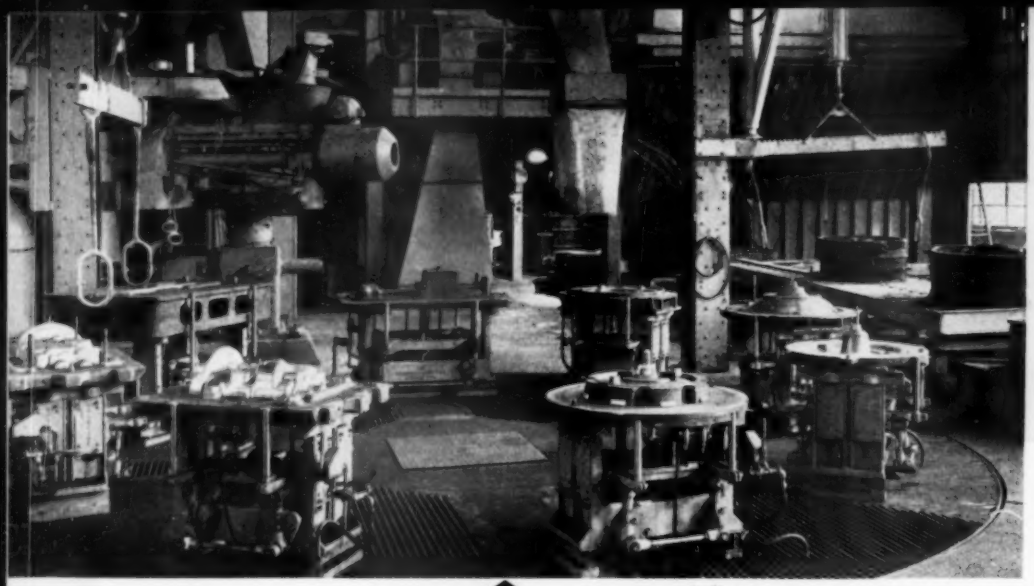
By BEARDSLEY & PIPER

At A.F.S. Foundry Congress and Show—Booth No. 1206 to 1208 and 1309 to 1311

The Junior Nite-Gang—The portable Junior Nite-Gang offers the same thorough sand conditioning as the Nite-Gang. This machine is loaded by front end loader, crane bucket, belt, shovel, or other means and has a capacity of approximately forty tons per hour.

The Nite-Gang—A self-propelled, self-feeding machine, the new Nite-Gang answers a long felt need in the foundry industry. It eliminates manual operations and provides *complete* conditioning . . . blending, magnetic separation, lump breaking, screening and aeration of up to forty tons of sand an hour. Wherever molding sand is prepared on the floor of the foundry, the Nite-Gang offers thoroughness of conditioning never before available.

See other Better Foundry Methods on following pages!



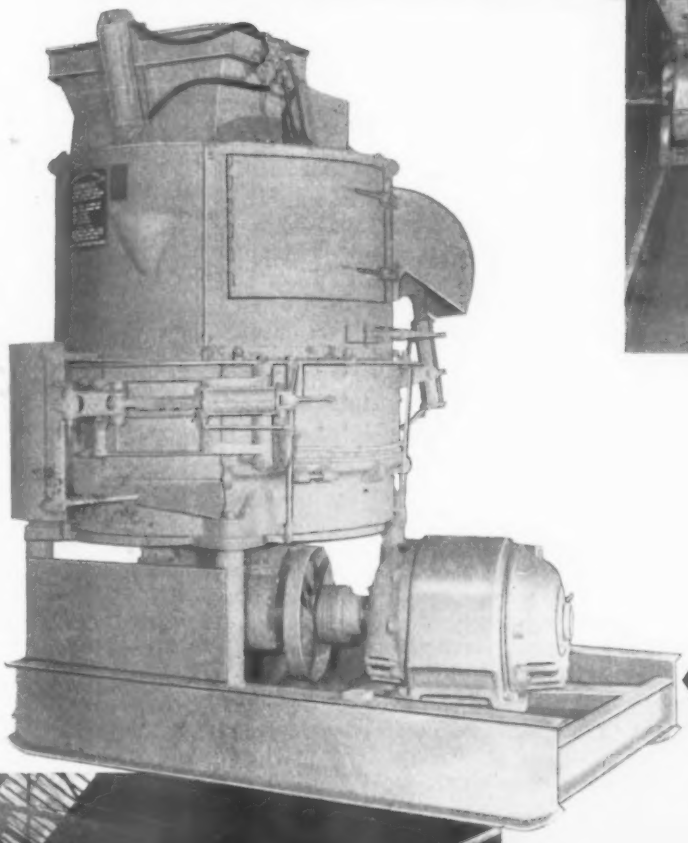
BETTER METHODS
By Beardsley & Piper

Multiple Station "Slinger" Installation—No other molding method offers the high production and flexibility of these units. Automatic and manually controlled Speedslinger multiple station installations produce molds at the lowest possible cost. Speedslinger, B&P Turntable and B&P Champion Speed-Draws are engineered and built as a team for maximum efficiency and coordination. The exceptional versatility of these units makes them adaptable to the widest variety of high production jobs.

Combination Sand Conditioning and Mulling Unit—Spearheading the new trend towards the use of all-purpose mulled molding sand, these package units offer all the sand conditioning advantages of a complete sand system at moderate cost. Built in six sizes, with capacities of six to sixty tons an hour, these Preparator-Speedmullor units screen, magnetically separate, aerate, completely mull and cool the sand.

The Tractor Sandslinger
A completely self-contained unit, the Tractor Sandslinger is ideal for use in foundries having no auxiliary sand system. It blends, aerates and screens the sand and then rams it into molds with characteristic Sandslinger uniformity and hardness.

The Motive Sandslinger—One of the most popular Sandslingers for jobbing foundries, the Motive type provides the necessary flexibility for the ramming of molds and cores of greatly varying size.



The Speedmullor—Lowest original cost—lowest maintenance cost—lowest power cost per ton of sand—mulled to its ultimate physical properties. The Speedmullor completely mulls molding and core sands 4½ times as fast as any other sand mullor. Speedmullor cooling is the only really efficient and positive method of cooling while mulling . . . the only method in which cooling air passes *through* the mass of sand.

The Motive Speedslinger—Designed for ramming medium and heavy, pit and floor molds in jobbing foundries, the Motive Speedslinger has a greater range of operation and ramming capacity than any other molding method.

See other Better Foundry Methods on next page!

BETTER METHODS
By Beardsley & Piper

B&P

The Mulbaro—Thorough mulling, minimum sand handling, lowest initial and operating cost and *real* portability are just a few of the many Mulbaro advantages. Several barrows may be used alternately, thus providing the capacity of two or more mullors for slightly more than the cost of one.

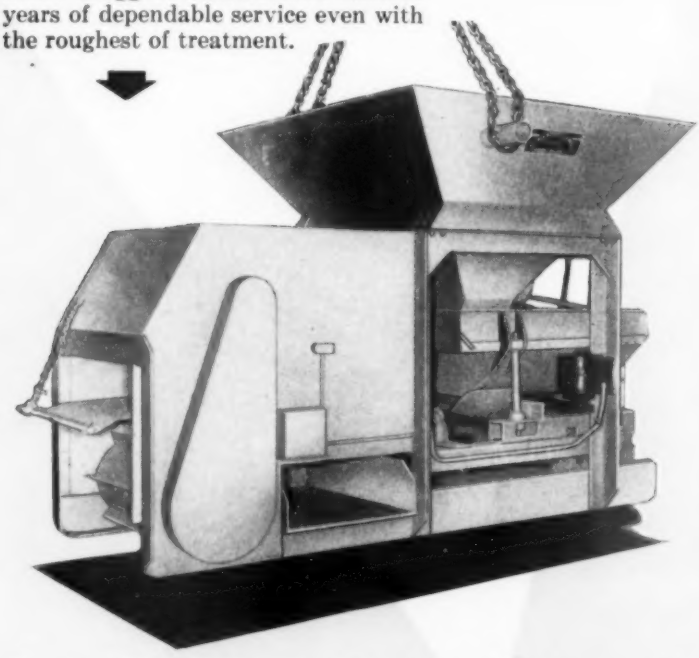
The Screenarator

Three Screenarator models provide capacities of 750, 1000 and 1500 pounds per minute of thoroughly screened and aerated sand. Thousands of low cost Screenarators are in service in foundries all over the world and have proved to be an unbeatable sand conditioning investment.

The Laboratory Mulbaro

The Laboratory Mulbaro thoroughly and uniformly mulls test batches facilitating close laboratory control of all sand supplied to the foundry. Two or more mixing bowls may be used with one machine permitting several mixtures to be prepared and tested without contamination of one batch by another and without loss of time. The removable mixing bowl and pivot mounted mulling mechanism permit easy cleaning.

The Preparator—The efficient, heavy duty, streamlined, portable Preparator screens, breaks lumps, magnetically separates, aerates and discharges up to sixty tons of sand an hour. Rugged construction assures years of dependable service even with the roughest of treatment.



BEARDSLEY & PIPER
Division of Pettibone Mulliken Corp.
2424 N. Cicero Ave., Chicago 39, Illinois

MEMBER FEMA

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- ☐ Complete Sand Conditioning and Mulling Unit
- ☐ Speedmullor
- ☐ Motive Sandslinger
- ☐ Motive Speedslinger
- ☐ Stationary Sandslinger
- ☐ Stationary Speedslinger
- ☐ Hydra-Slinger
- ☐ Tractor Sandslinger
- ☐ Mulbaro
- ☐ Laboratory Mulbaro
- ☐ Screenarator
- ☐ Nite-Gang
- ☐ Junior Nite-Gang
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AFS MEETS IN CLEVELAND

(*Concluded from page* 99)

addition to the Educational Division dinner meeting on Tuesday, several other dinners are scheduled. Chapter officers and directors will gather for their annual meeting Monday evening with AFS President Edwin W. Horlebein presiding. The annual Canadian dinner will be held Tuesday evening, and the AFS Alumni group will dine Thursday evening. Foreign visitors, a considerable

LEONARD E. READ
Banquet Speaker

number of whom are expected to attend the Cleveland convention, will be honored by a reception the society is sponsoring Tuesday at 4:30 p.m.

The reception for international visitors, to be held at Hotel Statler, is likely to bring together delegates from at least ten foreign countries, it is indicated by advance reservations made by foundrymen from abroad. Visitors from Great Britain will be headed by N. P. Newman, president of the Institute of British Foundrymen, who is managing director of Newman, Hender & Co. Ltd., Woodchester, Glos.

Annual Business Meeting — Business meeting of the society will be held Wednesday at 3 p.m. No other sessions are scheduled for that afternoon, and the Foundry Show exhibits also will be closed. In addition to the president's annual address, the program includes election of officers and directors and awarding of prizes in the national apprentice contest.

Nominees for 1950-51 officers and new directors to be voted on at that meeting are: President, Walton L. Woody, National Malleable & Steel Castings Co., Cleveland; vice president, Walter L. Seelbach, Superior Foundry Inc., Cleveland. Director for one year: Retiring President Edwin W. Horlebein, Gibson & Kirk Co., Baltimore. Directors for three years: J. J. McFadyen, Galt Malleable Iron Co., Galt, Ont., Canada; J. O. Ostergren, Lakey Foundry & Machine Co., Muskegon, Mich.; Frank W. Shipley, Caterpillar Tractor Co., Peoria, Ill.; James Thomson, Continental Foundry & Machine Co., East Chicago, Ind.; E. C. Troy, National Engineering Co., Palmyra, N. J.

Immediately following the annual business meeting, the Charles Edgar Hoyt Annual lecture will be presented by W. W. Levi, metallurgist, Lynchburg Foundry Co., Radford, Va., on "Operation of the Cupola."

Mr. Levi, who is well known as a technical speaker before foundry groups, received a degree in chemical engineering from the University of Michigan and later did postgraduate work in France. He has been an active member of the AFS Gray Iron Division, serving on the program and papers, shop course, section size relationships and test bar design committees.

Non-Ferrous Founders Plan Son-Father Dinner

Non-Ferrous Founders' Society will sponsor a Son-Father Dinner during the AFS Cleveland convention. It is scheduled for 6:30 p.m., Monday, May 8, at the Cleveland Athletic Club. Patterned after the dinner held a year ago at St. Louis, it will honor veterans of the industry and their sons. The committee in charge of arrangements for the dinner is headed by Alex Cadman, the A. W. Cadman Mfg. Co., Pittsburgh, and Arthur Fischer, the Fischer Casting Co., Plainfield, N. J.

Annual Banquet — Departing from the practice of recent years, the annual AFS banquet will be held Wednesday evening instead of Friday. The site will be Hotel Statler's ballroom. Principal speaker will be Leonard E. Read, president, Foundation for Economic Education, Irvington-on-the-Hudson, N. Y., on the subject "Students of Liberty." The banquet also will be the occasion for the annual presentation of AFS awards to outstanding foundrymen for their contributions to the society and industry. Details on these awards are given on pages 110-111 of this issue. The Banquet Committee of Northeastern Ohio Chapter has Gilbert J. Nock, Nock Fire Brick Co., as chairman and Russell F. Lincoln, Russell F. Lincoln & Co., as vice chairman.

Ladies Entertainment—Lady visitors accompanying AFS members to Cleveland during convention week will be guests of the Northeastern Ohio Chapter in a program of entertainment arrangement by a committee headed by Mrs. Frank G. Steinebach, chairman, and Mrs. Gilbert J. Nock, vice chairman. Registration headquarters for ladies will be on the mezzanine floor of Hotel Cleveland. The registration desk will be open from 1 to 4 p.m. on Sunday, May 7; from 9:30 a.m. to 5 p.m. Monday through Wednesday, and 9:30 a.m. to noon Thursday. A group directed by Mrs James G. Goldie and Mrs. Lloyd W. Leeseberg will be in charge of registration.

The ladies' entertainment program will open Monday afternoon with tea tendered by the national AFS. It will be held in the ballroom of Hotel Cleveland at 3 p.m. and will feature a duo-piano recital by Thelma Merner Goldsword and Ruby Chavalier Carroll. Hostesses at the tea will be Mrs. Arthur J. Tuscany and Mrs. Fred J. Pfarr.

On Tuesday a luncheon, followed by a style show, is scheduled for 1 p.m. in the auditorium of the Higbee Co. store. Mrs. F. Ray Fleig and Mrs. Thomas G. Johnston are hostesses for this event.

No formal entertainment is planned for Wednesday, the day of the annual banquet. Thursday's program includes a sight-seeing tour of Cleveland's parks, cultural centers, residential districts and shore drives. Buses will start from Hotel Cleveland at 11 a.m., the tour ending at Hotel Lake Shore in time for lunch. This will be followed by a book review by Aileen Benninghoff. Buses will return the visitors downtown about 3 p.m. Hostesses for the day will be Mrs. Gilbert J. Nock and Mrs. John A. Sharritts.

W. W. LEVI
Charles Edgar Hoyt Lecturer

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Norse Foundrymen Visit U. S. A.

A delegation of technical and operating men representing the Norwegian foundry industry is touring foundry centers in the United States, with a stop scheduled for Cleveland during the AFS convention. John Sissner is team leader, with Torolf Krogvig as secretary. Mr. Sissner is a member of the AFS and ASM and the Institute of British Foundrymen. Author of *Cast Iron Metallurgy* and *Modern Foundry Technic,* he was awarded a silver medal in 1939 by the Polytechnic Association of which he previously was secretary general. He is chairman, Norwegian Foundry Technical Association, a consulting engineer and Scandinavian representative of the International Meehanite Metal Co. A previous visitor to the U. S. A., he worked here as a furnace man in 1920-21.

Torolf Krogvig is a consulting engineer and chief engineer, Statens Teknologiske Institut, Foundry Division; secretary, Norwegian Foundrymen's Association; honorary member, Norwegian Superintendent's Association; editor, *Foundrymen's Journal of Norway;* member AFS; author of *Foundry Technology for Moulders;* and worked in American foundries in 1932.

Other members of the team include Harry Karlberg, molding foreman, A/S Myren's Verksted, Oslo; Ivar Larsen, molder; Karl Stenstadvold works manager, Foss Jernstoperi, Oslo; T. O. Jahren, patternmaker foreman, A/S Fredriksstad mek. Verksted, Fredrikstad; Birger Marthinsen, molder, Knut Tronstad, assistant to works manager, Jotul og Kvaerner, Ovnstoperi, Oslo; Einar Johnsen, molding foreman; Ragnar Olesen, molder; Ragnar Astad, works manager, Sandnes Stoperi, Sandnes; Tonnes Tollefsen, molder; Torkel Serigstad, molding foreman, Serigstad Mask Verksted; Gunnar Myhrvold, molding foreman, Hamar Jernstoperi; Ragnar Byrnildsbakken, chief engineer, A/S Strommens Verksted, Strommen; Oddleiv Kristiansen, molder, Raufoss Ammunisjonsfabrikker, Raufoss; Conrad Birkeland, works manager, Norwegian State Railway Co., and chairman, Norwegian Advisory Council for Foundries.

Book Review

Welding Handbook, third edition, cloth, 1651 pages, 6 x 9 in., published by the American Welding Society, New York. Price $12.

The handbook, perhaps the most authoritative work on the subject, was prepared under the direction of the welding handbook committee of the society, and represents the effort and experience of more than 250 experts.

Twenty-seven chapters are devoted to the more than 30 welding and cutting processes used in industry today. Thirteen chapters contain information on ferrous and nonferrous metals commonly welded, including their general properties, how to weld them with the different welding processes and their use by different industries.

Eleven chapters contain information on design, material, workmanship and inspection requirements for industrial applications. Additional chapters are devoted to data for estimating costs, physics of welding, welding metallurgy, a dictionary of welding terms and definitions, general engineering tables for shop and office use and welding standards. More than 300 tables and a 69-page index are included.

Survey of Foundry Earnings

National Foundry Association, 53 West Jackson Blvd., Chicago 4, has completed its annual survey of earnings in foundry occupations, and copies have been mailed to the 1200 foundries which contributed information and statistics to make the study possible. The survey covers straight time hourly earnings in the 19 important labor classifications connected with foundry operations. Rates in these classifications are designated by cities. The document also carries an outline of the technical literature published by the National Foundry Association, together with "The National Program for the Foundry Industry," as outlined by the association.

Meetings of Interest to Foundrymen

May 8-12—American Foundrymen's Society, annual convention and exhibition, Public Auditorium, Cleveland

May 19—Malleable Founders' Society, eastern sectional meeting, Commodore Hotel, New York

May 26—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

June 1-3—Electric Metal Makers Guild, annual meeting, Shawnee Hotel, Springfield, O.

June 22-23—Malleable Founders' Society, annual meeting, The Homestead, Hot Springs, Va.

June 26-30—American Society for Testing Materials, annual meeting and exhibition, Haddon Hall, Atlantic City, N. J.

July 28—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

Sept. 25-26—Steel Founders' Society of America, fall meeting, The Homestead, Hot Springs, Va.

Sept. 28-29—All Canadian Foundry Conference, Hamilton, Ont.

Oct. 12-14—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

Oct. 13-14—Gray Iron Founders' Society, annual meeting, Netherland Plaza Hotel, Cincinnati

Oct. 13-15—Non-Ferrous Founders' Society, annual meeting, Hotel Statler, Boston

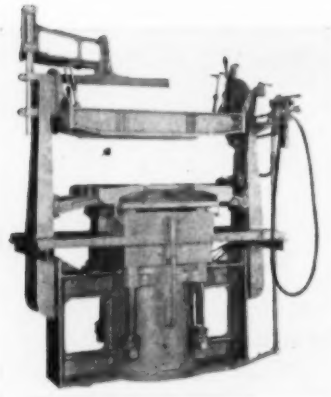
Oct. 19-20—Texas Regional Foundry Conference, San Antonio, Tex.

Oct. 23-27—National Metal Congress and Exposition sponsored by American Society for Metals, American Welding Society, Metals Branch—American Institute of Mining and Metallurgical Engineers, and Society for Non-Destructive Testing, International Amphitheatre, Chicago.

Nov. 2-3—Metals Casting Conference, sponsored by Purdue University with Central Indiana and Michiana Chapters of AFS, Purdue University, West Lafayette, Ind.

Nov. 9-10 — National Foundry Association, annual meeting, Edgewater Beach Hotel, Chicago

Nov. 9-11—Steel Founders' Society of America, annual technical and operating conference, Carter Hotel Cleveland



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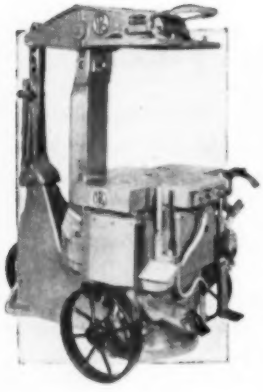

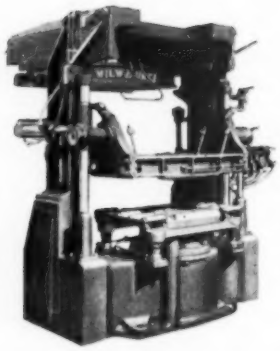

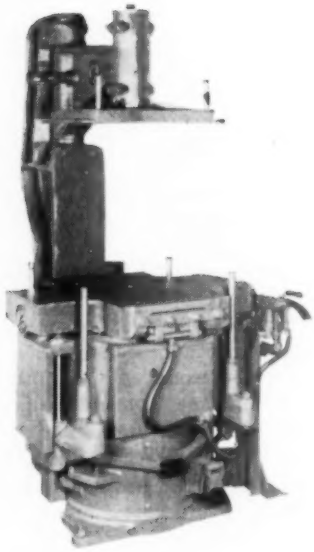

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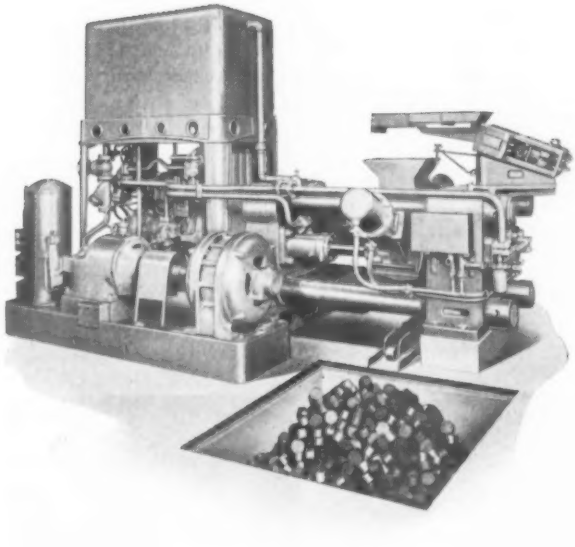

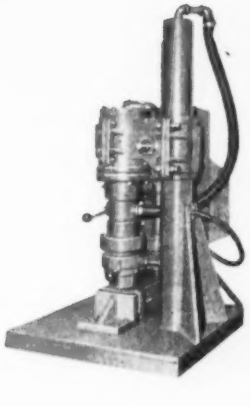

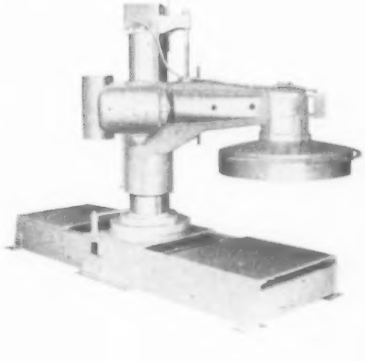

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STEEL FOUNDERS' SOCIETY

Holds Annual Meeting

By FRANK G. STEINEBACH
Editor
and ERLE F. ROSS
Chicago Editor
THE FOUNDRY

RESEARCH, product development, cost control, and pension and insurance plans were topics featured in discussions at the annual meeting of the Steel Founders' Society of America held at the Edgewater Beach Hotel, Chicago, Mar. 21-22. An attendance of 290 set a record for the society.

Announcement was made of the re-election of the following officers: President, Thomas H. Shartle, president, Texas Electric Steel Casting Co., Houston, Tex.; vice president, John E. Mullen, vice president in charge of sales, National Erie Corp., Erie, Pa.; treasurer, Royal G. Parks, controller, National Malleable & Steel Castings Co., Cleveland. G. Rhoads Casey, chairman of the board, Treadwell Engineering Co., Easton, Pa., was elected to the executive committee to serve with Mr. Shartle and Mr. Mullen.

The Lorenz Memorial Gold Medal for 1949 was awarded to A. J. McDonald, vice president, American Steel Foundries, Chicago, for distinguished service to the steel casting industry. John F. Lacey, works manager, Commercial Steel Casting Co., Marion, O., received the National Technical and Operating Gold Medal for 1949 for outstanding service in the technical and operating field of the industry. Sam F. Carter, American Cast Iron Pipe Co., Birmingham, won first prize for the best contribution to "Steel Foundry Facts" during 1949.

In the annual report of the executive vice president, F. Kermit Donaldson discussed the various meetings of the industry held the past year and outlined the numerous activities of society committees. He pointed out that the Advertising and Public Relations Committee was most active during the year, sponsoring such work as publication of the booklet "A Steel Casting Industry, Build With Steel Castings," production of ten additional display panels for the educational program at engineering schools; revision of the direct mail list; sponsoring work of the publicity and public relations representative and preparation of displays for the fall and annual meeting of the society.

Mr. Donaldson reported that during the year the society became associated with the Foundry Educational Foundation. Also, the liaison program with the engineering schools has been completely revised under the sponsorship of the Educational Committee. In conclusion Mr. Donaldson stressed the fact that somehow the industry must find time for critical self examination, time to think and plan for a vastly better industry in a very much better nation—in a vastly improved world. The steel foundry industry must be more articulate. Unless this is done, he believes that the industry is falling short of its job.

Charles W. Briggs, technical and research director, reported in some detail on technical and research activities. He reviewed the work of the Technical and Operating Committee, which included the sponsoring of the annual T & O Conference in Cleveland in September, where the program featured metal fluidity and temperature control, a quiz session, consideration of reduction of costs and improvement of quality, and discussion on methods of redesigning weldments and forgings to steel castings. Eighty-one group meetings of the T & O group also were held during the year.

Mr. Briggs stated that during the year only one research report was issued, dealing with the flow of molten steel in sand molds. A 45-minute silent color movie, produced in conjunction with that report, is being released to member companies for plant showing. The contest sponsored by the National Safety Committee during June, July and August, with 132 foundries participating, resulted in 39 foundries maintaining perfect safety records and 14 others having cumulative frequency ratings of 10 or less for the three months. As a result, 53 foundries received contest awards, compared with 32 the previous year. Mr. Briggs also reported that the board of directors had decided to revise the handbook and that a number of chapters are being rewritten and revised.

William J. Phillips, product development director of the society, outlined work done the past year in furthering use of steel castings. One phase of this program has had excellent results. A foundry arranges

THOMAS H. SHARTLE
President

J. E. MULLEN
Vice President

G. RHOADS CASEY
Executive Committeeman

for some of its personnel to visit the plant of a customer during the day and study the components used to manufacture the latter's product. That evening one of the foundry personnel will discuss steel castings as compared with other types of components, and indicate where steel castings might be used advantageously. Best results have been secured where both the customer and the foundry have standards departments to provide cost data to determine if castings can compete with other methods of fabrication. Mr. Phillips also reported a conference is to be held at Purdue University where representatives of castings, forgings and weldings will discuss the reasons for use of these fabricating methods for particular types of components.

Safety Records Announced

Following luncheon, announcement was made of the foundries with outstanding safety records for 1949. These included:

With frequency rates of 0: Calumet Steel Castings Corp., Hammond, Ind.; Gunite Foundries Corp., Rockford, Ill.; Hughes Tool Co., Houston, Tex.; Skagit Steel & Iron Works, Sedro-Woolley, Wash. Frequency rates under 10: 1.6, Carnegie-Illinois Steel Corp., Johnstown, Pa.; 2.3, Bethlehem Steel Co., Bethlehem, Pa.; 4.2, Chapman Valve Mfg. Co., Indian Orchard, Mass.; 5.3 Symington-Gould Corp., Depew, N. Y.; 5.7, General Steel Castings Corp., Eddystone, Pa.; 6.1, Mackintosh-Hemphill Co., Pittsburgh; 6.6, General Steel Castings Corp., Granite City, Ill.; 6.7, Ross-Meehan Foundries, Chattanooga; 7.1, Continental Foundry & Machine Co., East Chicago, Ind.; 8.6, Bethlehem Steel Co., Steelton, Pa.; 8.9, Key Co., East St. Louis, Ill.; 9.1, Unitcast Corp., No. 1, Toledo, O.

An interesting report of the Product Development Committee was presented by A. J. McDonald, chairman. He said the product development director had given 77 talks on the general subject of quality improvement and 66 presentations selling the industry and its products to engineering societies, individual customers and educational institutions. Mr. McDonald indicated that the Specifications Committee has been at work through members in eight districts and that it is anticipated a recommended definition of minimum standards of quality for ordinary carbon steel castings will be presented for approval soon.

Mr. McDonald stated that the committee wishes to re-emphasize three recommendations previously made: That each foundry have a product development engineer or someone to function in a similar capacity in the development of new uses and the improvement of existing steel casting applications; that much greater attention be given to the selection and training of salesmen and sales engineers, pointing to the necessity of having well qualified men to sell cast steel parts intelligently on something other than price; that a program of quality improvement in costing methods be initiated in each individual plant.

The committee recently sent a questionnaire to 150 foundries and of the 55 replies received, 22 reported actual accomplishments from the product development program and 18 reported encouraging starts. The 22 foundries reported approximately 4425 tons of conversions of other products to steel castings had produced an approximate value of $1,825,000. In closing, Mr. McDonald stated that tangible dollars-and-cents results are beginning to accrue to the more alert industry members as a result of product development application.

William T. Bean, Jr., consulting engineer, Detroit, presented an interesting discussion on "Good Casting Design—On Purpose." Mr. Bean stressed the importance of management assistance and stated that management, to be good, should run interference, not cause it. In the matter of design he emphasized that good design and good foundry practice fortunately are compatible. In his opinion it is more important to give the other fellow more for his money if successful operations are to continue. Mr. Bean closed with his famous coat hanger demonstration which illustrated the import-

(*Concluded on page* 171)

1949 GOLD MEDAL WINNERS OF THE SFSA

JOHN F. LACEY
T. & O. Medalist

John F. Lacey, works manager, the Commercial Steel Casting Co., Marion, O., is a veteran operating executive known widely in the industry. After leaving Kent University he taught school for three years and then spent two years with the Hydraulic Press Mfg. Co., Mt. Gilead, O. Beginning at the Commercial Steel Casting Co. in 1922, he first served as a shipping clerk and worked progressively through piecework rate-setting responsibilities, as assistant production manager, production manager, and works manager, to which latter post he was appointed in 1937. Mr. Lacey has been active in affairs of the Steel Founders' Society for a number of years and served as chairman of the society's Division No. 5 Technical and Operating Committee. He subsequently became chairman of the national Technical and Operating Committee, which office he has filled for the last three years.

A. J. McDONALD
Lorenz Medalist

A. J. McDonald, vice president of American Steel Foundries, entered the foundry industry with the Standard Roller Bearing Co., Philadelphia. He later became purchasing agent of the company, and when it was acquired by the Marlin-Rockwell Co., Mr. McDonald served as purchasing agent for several additional subsidiaries. Leaving Marlin-Rockwell in 1919, he joined Lebanon Steel Foundry, Lebanon, Pa., as a salesman, later becoming manager of sales, and vice president in charge of sales. Mr. McDonald resigned from Lebanon in 1939 to become vice president in charge of sales for American Steel Castings Co., Newark, N. J., a subsidiary of American Steel Foundries. Four years later he was elected vice president of the latter and was transferred to the company's main offices in Chicago in charge of industrial steel casting and automotive division sales.

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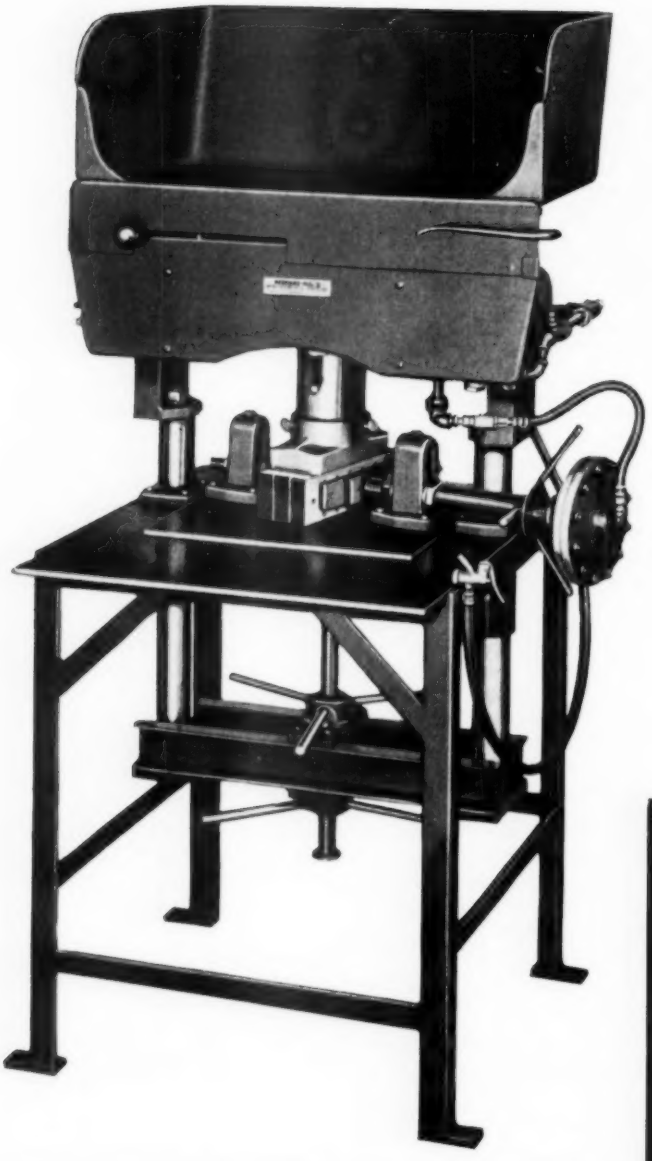

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New standards are being set with this machine, because every motion of your operator has been correctly evaluated to obtain a maximum of production with a minimum of effort.

8 OUTSTANDING FEATURES:

1. Large stationary work area.
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CAPACITY: Cores up to 5#

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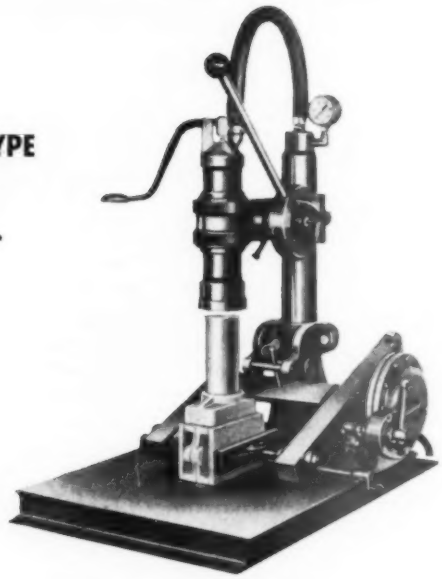

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(*Concluded from page* 169)

ance of proper design of any product.

To control costs, management must know its costs. This was an introductory statement made by Clarke L. Shabino, Peat, Marwick, Mitchell & Co., Chicago, certified public accountants, in addressing the Wednesday morning general session on "Managerial Control of Variable Costs."

Some costs can be controlled, some only partially and some not at all, the speaker asserted. He divided costs into four general categories: (1) Expenses related directly to activity; (2) expenses only partially related to activity; (3) expenses not related at all to activity, although possibly related to anticipated activity; and (4) expenses related to the long-range view. Tools of control, Mr. Shabino continued, are three: (1) The accounting systems; (2) reports; and (3) budgetary control system.

Favors Monthly Reports

Among important reports, he mentioned profit and loss statements, detailed reports by jobs, materials reports, labor reports, departmental efficiency reports, payroll analyses, overhead reports, and the like. To be useful and effective, reports should be issued at least monthly—more frequently if possible—and be issued promptly.

Mr. Shabino pointed out that there are two classes of expense budget. One presents a fixed forecast where business of the company is stable; the other presents a variable or flexible budget where volume undergoes change.

"Pension and Insurance Plans" were outlined in a most illuminating fashion by William W. Fellers, Washington office of the Wyatt Co., Chicago, consultant on pensions and benefit plans. Subject was introduced by an outline of developments starting with passage of the Social Security Act in 1935.

Principal considerations in any pension plan, Mr. Fellers emphaized, are the amount and range of the benefits. In general, two plans are used. In one, pensions are paid from payroll and considered as payroll continuation. The other sets up a pension fund; this procedure, according to the speaker, is the more satisfactory to employees because of the permanence afforded over the payroll continuation arrangement.

Among the many factors affecting pension costs is that of mortality or life expectancy. Rule of thumb for calculating life expectancy of employees is to subtract an individual's age from the fixed figure of 85, then multiply by the factor 0.7. Life expectancy has increased markedly over the years, currently being 65 years.

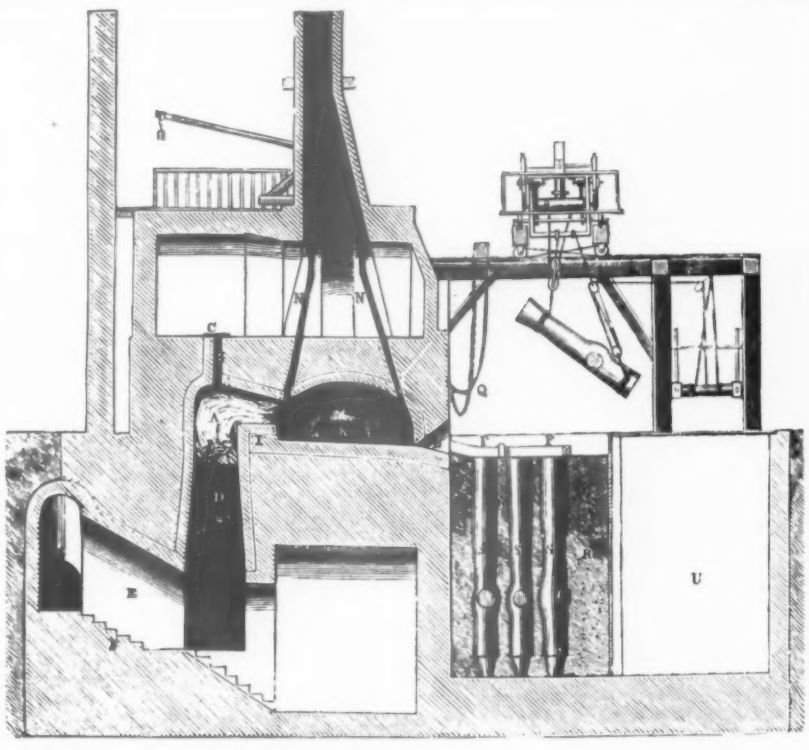
Another and most important factor is that of interest earned by the fund. Proof of this, the speaker pointed out, is that $1 invested at 3 per cent interest doubles itself in about 23 years. Consequently, a company can discount its investment in a plan, although not to the extent it would expect it should. Still another factor is the age level of employees when the plan is initiated. This determines how much capital and accumulated interest the employer must put up for employees approaching retirement age.

Many plans provide for pensions related to salary or wage levels. Mr. Fellers observed that the usual procedure is to base the pensions on average earnings over the ten-year period prior to retirement.

Most prevalent practice is to base pension plans on retirement at 65. Surprisingly cost to the employer decreases 20 per cent when retirement takes place at age 68, and 28 per cent when retirement is at 70. On the other hand, cost increases about 50 per cent if the employee retires at 60.

In summarizing, Mr. Fellers emphasized that the sound basis for setting up a pension fund is what is sound actuarily. His listeners were provided a sheet detailing ranges in costs in cents per hour for unidentified companies under the Ford, Modified Ford, UAW, Bethlehem Steel, United States Steel and Republic formulas. Another sheet presented examples of benefits under the Bethlehem and Modified Ford formulas. These data showed the most costly plan is that proposed by the UAW. The speaker explained that there are no known settlements on this basis.

Speaker at the industry lucheon concluding the two-day meeting was James D. Arrington, mayor, Collins, Miss., and editor and publisher of the *Collins News-Commercial*. A humorist of the first order, he nevertheless conveyed a serious mesage under the topic, "Yesterday, Today and Tomorrow." In essence, he charged that Americans worry too much, and frankly suggested they do some serious thinking to solve their problems.



BRONZE CANNON were being made and used as recently as one hundred years ago. The alloy used was 90 parts copper to 10 parts tin. It took 13,481 pounds of bronze to make a cannon casting of 8291 pounds. Fuel used was wood, and, as shown by the sectional drawing, the metal was melted in a reverberatory furnace. The cannon was cast vertically, four from each cast if not too heavy. (From Muspratts' *Chemistry* published in England in 1853, p. 548)

SAND RECLAIMED BY HYDRO-BLAST

- **Will produce better castings than new sand**
- **Cost much less than new sand**

AND WE'LL BE DELIGHTED TO PROVE IT!

By sand reclamation we mean "the processing of waste foundry sand in such a manner that it will replace new sand in core and molding sand practice with equal or superior results."

We do not consider that either

- passing used sand through air separators to remove fines, or
- adding used core sand to molding sand to increase permeability

can be defined as Sand Reclamation.

Good reclaimed sand, in the Hydro-Blast book, must be equivalent or superior in every respect to new sand—for example, as to

- permeability
- compressive strength
- controlled density
- baked tensile strength
- dry strength
- hot properties

It must correspond closely to parent new sand as to control of grain size and grain distribution, as to loss on ignition and gas evolution.

Hydro-Blast reclaimed sands meet all those qualifications.

At the Foundry Show
Booth 410
Auditorium Exhibit Hall

HYDRO-

2550 NORTH WESTERN AVE.

In the case of used sand from a good parent sand, the Hydro-Blast method of reclamation will accomplish *85 to 95* PER CENT RECOVERY

Direct savings resulting from use of the Hydro-Blast Sand Reclamation System will, as a rule, pay for the installation within two to four years. Even more important, though impossible to calculate, are the indirect benefits—

- **The *economy of using a better quality of sand***
- **The resulting improvement in finish of castings and in the quality of castings**
- **The important corollary benefits through reduced costs of cleaning and machining**

A sound and essential first step toward realizing these fundamental benefits is to discuss your sand problems with Hydro-Blast engineers.

Advantages to you of such conversation are specific and immediate:

- As a result of fourteen years of continuous study of foundry waste sands and how to reclaim them, *Hydro-Blast engineers know the answers*
- You can avoid a painstaking and costly process of trial and error by using that wealth of Hydro-Blast experience as your own—we have made the mistakes and paid for them
- Through our own exhaustive program of study and test we have learned how to evaluate a foundry's sand problems by analysis of its waste sands
- Thorough tests of your waste sands, comparable to actual production conditions, are available to you in the Hydro-Blast pilot plant—a complete sand reclamation system of 3 tons per hour capacity
- That pilot plant is available to you for a processing test of waste sand from your foundry—a sample of not less than 10 tons. Hydro-Blast experience has proved that tests of samples less than 10 tons are inconclusive and not to be relied upon; and that a processing rate of less than 3 tons per hour does not simulate actual foundry operation

As a result of such a test, the 9 tons of sand reclaimed from your 10-ton sample will be returned for use in making castings in your foundry.

One additional vital discovery you will make, through any experience with Hydro-Blast—

- *The Hydro-Blast process of cleaning castings and sand reclamation eliminates many sources of dust in the foundry, and greatly improves working conditions.*

Doesn't it appear that you and we can profitably "talk sand?" You say when.

-BLAST CORPORATION

CHICAGO 47, ILLINOIS

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Italy—Azeta, Viale Tunisia 41, Milano

By EDWIN BREMER

Foundry DEVELOPMENTS

CONSIDERABLE interest seems to have arisen lately in a process for making castings which uses thin shell-molds of the same contour as the patterns. Odd feature is that the procedure hardly is new; this department in the April, 1948 issue on page 132 presented some practical working facts regarding it. Later in the October, 1948 issue on page 130 an article entitled "Precision Molding Process Employs Resin Binder" by W. M. McCullough described the procedure in more detail.

Briefly, it was developed in Germany and is known as the "C" or Croning process. Molding material is a dry mixture of silica sand with 6 to 8 per cent resin binder which is placed in a flask on a heated pattern for a few seconds to produce the shell mold. Excess material is dumped out for further use. Pattern and its covering shell-mold are placed in an oven to polymerize or harden the mold. Half molds are pasted together and backed up with shot or dry sand for pouring. Cores are made by blowing the mixture into heated coreboxes. Molds and core walls are about ⅛ to $\frac{3}{16}$-in. thick, and it is claimed that exceptionally smooth surfaces and thin section castings can be produced in ferrous and nonferrous alloys.

* * *

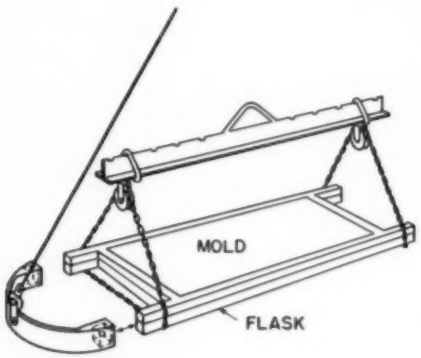
RECENTLY D. H. Woodard, National Bureau of Standards, developed a technique which uses polarized light to make visible differences in orientation that result from deformation of a fully annealed specimen of Monel metal. Procedure is to give the polished specimen a 4-second etch with an aqueous solution of chromic and nitric acids in ammonium chloride which makes the surface optically active. Though use of the technique thus far has been confined to Monel, the method is expected to find application in studies of plastic deformation in other metals such as copper, aluminum, nickel and alpha iron.

* * *

LATEST issue of *Minerals Yearbook*, authoritative source of information on domestic and foreign mineral commodities compiled by the Bureau of Mines, now is available for $4.25 from the Superintendent of Documents, Government Printing Office, Washington 25. Containing 1593 pages of basic data for the year 1947, the book records output distribution and consumption of all known mineral commodities. Various commodities are arranged alphabetically in 64 chapters from abrasives to zinc.

* * *

ACCOMPANYING illustration shows a strongback which lifts mold flasks weighing up to a ton and saves steps in rolling over. Designed by a molder at the Long Beach Naval Shipyard, it consists of an 8-ft inverted T-bar, serrated on its upper edge to hold flasks of several lengths, from which two chain loops are suspended. A U-shape handle at each end of the flask aids in flipping it over while supported in the loops. Lifting is done by means of a V-bar welded to the center of the strongback.



ONE ON EACH END

* * *

GRAPHITE in briquet form is a good material for increasing the carbon content in gray iron where the charged raw material tends to produce total carbon lower than desired. Procedure is to place a number of the briquets on the sand bottom of the cupola before making up the bed, and to add some under the coke split.

* * *

CALCIUM, like cerium and magnesium, will produce nodular structures in cast iron, but it is extremely difficult to introduce into the iron, according to an investigation by Morrogh reported in the February issue of the *Journal of Research and Development*, British Cast Iron Research Association. As in the case of its counterparts, Ca will not dissolve unless the S content is 0.02 per cent or less, and the residual content of Ca must be above 0.02 per cent to produce completely nodular structures. Morrogh found that nodular structures could be produced by blowing a large excess of calcium silicide through molten hypereutectic iron with a stream of nitrogen.

* * *

RECENTLY issued U. S. Patent No. 2,500,556 describes a method of producing castings by using pressure just as the metal or alloy is freezing or solidifying. Metal mold is in sections designed so that they are slightly separated while being filled with molten metal. Mold sections are brought together in final position just as the flow of metal through the cavity is being arrested by solidification. Procedure is claimed to produce a strong dense casting with fine surface detail.

* * *

NEWEST aid to various industrial operations is wired television which permits "close-up" viewing of operations at a distance. Camera is located close to the operation, and the viewing screen up to 1000 ft or more away. Viewing angle of lens is 150°, and the lens is quite sensitive to infrared light, permitting it to penetrate smoke and fog. It is claimed that the device provides 60 individual image fields per second, that operation is stable once adjustment is correct, and simple to control. It is operated on any 105 to 125 v, 60 cycle circuit.

* * *

BUREAU of Mines recently published "Report of Investigations 4611 on Segregation of Impurities in Zinc-aluminum Alloys and Its Influence on Accuracy of Sampling." It shows the difficulties encountered when it is necessary to make accurate analyses for a segregated impurity present in very small amounts. Work was conducted by H. W. St. Clair and D. D. Blue, and indicates that the best procedure is to dip a sample from the melt while stirring vigorously with a motor-driven agitator, and to granulate the molten sample in a jet of water and compressed air. Segregation of iron was not observed which permits taking the sample from the fine granules.

Logan

..a name that

In this steel foundry, heavy molds move by transfer car from molding machines in foreground to pouring lines in rear. Logan rolls and mountings combine ruggedness with simplicity.

Carries Weight in the foundry field

Both literally and in reputation — Logan Conveyors carry weight around foundries and other heavy-industry plants.

Molds up to 5,000 pounds, massive flasks and castings are all-in-the-day's work with heavy-duty Logan installations. Engineered for the purpose, dependable Logan Conveyors are on the job every workday in the nation's foremost foundries.

And it is dependability, built up over years of service to the foundry industry, that makes the Logan *name* carry weight among foundry men everywhere.

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Logan Conveyors

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ABRASIVE CO.

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TENTATIVE SPECIFICATIONS FOR AUTOMOTIVE GRAY IRON CASTINGS

ASTM Designation: A 159— -49T

SCOPE

1. These specifications cover gray iron castings used in the automotive and allied industries.

HARDNESS

2. (a.) Castings shall conform to the requirements as to hardness prescribed in Table I. By agreement between the manufacturer and the purchaser, hardness may be specified at definite locations on the castings.

(b) Hardness tests shall be made near the fracture on the broken halves of the test bars. Test bars shall receive the same thermal treatment as the castings.

TABLE I—Physical Requirements of Automotive Gray Iron Castings[a]

Alloy No.[b]	Brinell Hardness Number	Transverse Strength Min. Lb	Deflection Min. in.	Tensile Strength Min. psi
110	187 max.	1800	0.15	20,000
111	170 to 223	2200	0.20	30,000
120	187 to 241	2400	0.24	35,000
121	202 to 255	2600	0.27	40,000
122	217 to 269	2800	0.30	45,000

[a] Properties determined on test bar 1.2-in. in diameter, broken on 18-in. supports.

[b] These numbers are identical with corresponding SAE numbers in the Standard for Automotive Gray Iron Castings of the Society of Automotive Engineers.

TRANSVERSE STRENGTH

3. (a) The transverse test bar when placed horizontally upon supports and tested under a centrally applied load shall conform to the requirements prescribed in Table I. The values shown in Table I are for the 1.2-in. diameter bar tested on supports 18 in. apart.

(b) Transverse tests shall be made on test bars as described in the Standard Specifications for Gray Iron Castings (ASTM Designation A 48). In case the size of the transverse test bar is not specified, the 1.2-in. diameter bar shall be used.

PHYSICAL PROPERTIES AND CHEMICAL COMPOSITION

4. (a) Castings, except those intended for brake drums and clutch plates shall conform to the requirements as to tensile strength prescribed in Table I.

(b) Brake drums and clutch plates are considered as special cases under these specifications. Materials intended for such services shall conform to the requirements listed in Table II.

(c) Tension test specimens shall be machined from the transverse test bars to the dimensions shown in ASTM Specifications A 48. By agreement between the manufacturer and the purchaser, tension test specimens may be taken at specified locations.

NOTE—Tension tests which are made on specimens taken from castings may not agree with tests on specimens taken from test bars even though cooling rates are similar. Proximity to heavy or light sections may cause unsoundness.

TABLE II—Chemical, Physical, and Structural Requirements of Automotive Gray Iron Castings for Brake Drums and Clutch Plates[a]

	Alloy No. 113[b, c]	Alloy No. 114[b, d]
Chemical Composition		
Total Carbon, per cent	3.40 min.	3.40 min. (mandatory)
Typical Compositional Ranges		
Silicon, per cent	1.10 to 1.70	1.10 to 1.70
Manganese, per cent	0.60 to 0.90	0.60 to 0.90
Sulphur, max. per cent	0.14	0.14
Phosphorus, max. per cent	0.20	0.20
Alloys	As required	As required
Physical Properties		
Brinell Hardness Number	179 to 229	207 to 269
Transverse Strength, min. lb	2200	2600
Deflection, min. in.	0.20	0.27
Tensile Strength, min. psi	30,000	40,000
Structural Properties		
Graphite[e]	Type A, Sizes 2 to 4	Type A, sizes 3 to 5
Matrix	Lamellar pearlite with ferrite if present not to exceed approximately 15 per cent	Fine lamellar pearlite with excess constituent, free cementite or free ferrite or both not to exceed approximately 3 per cent

[a] Properties determined on test bar 1.2-in. in diameter, broken on 18-in. supports.

[b] These numbers are identical with corresponding SAE numbers in the Standard for Automotive Gray Iron Castings of the Society of Automotive Engineers.

[c] Brake drums and clutch plates for moderate service requirements where high-carbon iron is desired and heat checking is a problem.

[d] Heavy duty drums and clutch plates where both heat checking and strength are definite requirements. Since the same base iron is indicated for both No. 113 and 114 it is presumed that alloys will be used especially in the latter to meet the strength and structural requirements.

[e] The type and size of graphite referred to in this table is in accordance with the Recommended Practice for Evaluating the Microstructure of Graphite in Gray Iron (ASTM Designation A 247).

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TENTATIVE SPECIFICATIONS FOR AUTOMOTIVE GRAY IRON CASTINGS

ASTM Designation: A 159—-49T

WORKMANSHIP AND FINISH

5. Castings shall represent good foundry practice, shall be smooth and clean, and shall be free from injurious flaws and defects. In other respects the castings shall conform to special requirements agreed upon by the manufacturer and the purchaser.

MACHINABILITY

6. Castings shall machine satisfactorily.

INSPECTION

7. The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered. The manufacturer shall afford the inspector, without charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications.

REJECTION

8. All castings which fail to conform to any of the provisions of these specifications shall be subject to rejection. Castings which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected and the manufacturer shall be notified promptly.

TABLE III—Typical Base Compositions of Automotive Gray Iron Castings[a]

Alloy No.[b]	Total Carbon Per cent	Silicon Per cent	Manganese Per cent	Sulphur Per cent	Phosphorus Per cent
110	3.40 3.70	2.80 2.30	0.50 to 0.80 0.50 to 0.80	0.12	0.25
111	3.25 3.50	2.30 2.00	0.60 to 0.90 0.60 to 0.90	0.12	0.20
120	3.20 3.40	2.20 1.90	0.60 to 0.90 0.60 to 0.90	0.12	0.15
121	3.10 3.30	2.10 1.80	0.60 to 0.90 0.60 to 0.90	0.12	0.12
122	3.00 3.20	2.10 1.80	0.70 to 1.00 0.70 to 1.00	0.10	0.10

[a] These suggestions are offered so that the manufacturer will guard against either a low value or a high value for both carbon and silicon. If either one is on the high side, the other should be low.

[b] These numbers are identical with corresponding SAE numbers in the Standard for Automotive Gray Iron Castings of the Society of Automotive Engineers.

APPENDIX

A1. The data in this appendix are furnished as information only and do not constitute a part of these specifications.

A2. Chemical Composition—The typical base compositions shown in Table III are furnished as information only and are not to be construed as required or sufficient. In some cases, it may be desirable to use alloying elements to obtain the specific service requirements demanded. The kind and amount of alloying constituents used should be a matter of agreement between the manufacturer and the purchaser.

A3. Alloying Elements—When alloying elements are specified, Table IV shows the practical range for commercial limits.

A4. Suggested Uses—Suggested uses for the several automotive gray iron castings prescribed in these specifications may be classified as follows:

No. 110—Miscellaneous soft iron castings in which strength is not of primary consideration. (Either as cast or annealed.)

TABLE IV—Residual and Alloy Ranges[a]

Elements	Permissible Residuals in Base Iron, Per Cent	Recommended Ranges (For Specification Purposes) from Mean Specified Alloy Content, plus or minus per cent
Nickel	0 to 0.20	0.15
Molybdenum	0 to 0.08	0.075
Chromium	0 to 0.10	0.10
Copper	0 to 0.20	0.10
Vanadium	0 to 0.03	0.03

[a] By agreement between the manufacturer and the purchaser, closer or wider limits than shown in this table may be acceptable.

No. 111—Small cylinder blocks, cylinder heads, air-cooled cylinders, pistons, oil pump bodies, transmission cases, gear boxes, clutch housings, etc.

No. 113—Brake drums and clutch plates for moderate service where high-carbon iron is desired and heat checking is a problem.

No. 114—Heavy duty drums and clutch plates where both heat checking and strength are definite requirements.

No. 120—Automobile cylinder blocks, cylinder heads, flywheels, cylinder sleeves, cylinder liners, pistons, etc.

No. 121—Truck and tractor cylinder blocks and heads, heavy flywheels, tractor transmission cases, differential carrier castings, heavy gear boxes.

No. 122—Diesel engine castings, liners, cylinders, pistons, and heavy parts in general.

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HERE'S ONE ALUMINUM CASTING ALLOY THAT OFFERS ALL THESE ADVANTAGES

- 38,000 to 44,000 p.s.i. Tensile Strength As-Cast.
- 10.0%—15.0% Elongation in two inches As-Cast.
- Greatest stable shock resistance of any aluminum alloy.
- Four times milling speed of 108 and 16 to 18 times that of gray iron and malleable.
- Superior corrosion resistance.
- Dimensionally stable As-Cast.
- No heat treatment necessary.
- All properties remain constant for life of casting.

ALMAG 35 *is produced exclusively from 99.8% or better virgin aluminum ingot, plus magnesium and small amounts of other alloying ingredients.*

It is truly the champion of all aluminum casting alloys.

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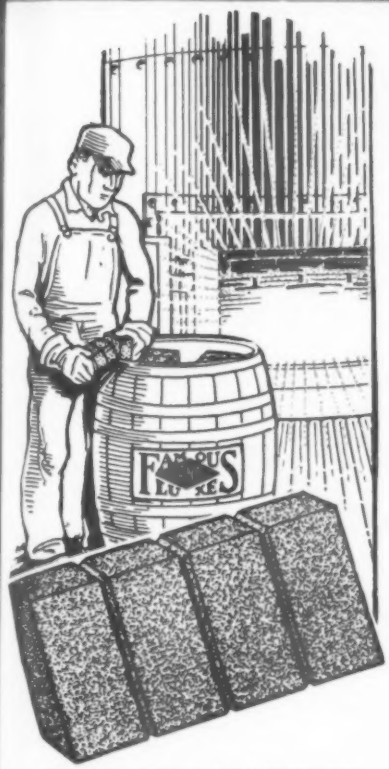

THE PRE-MEASURED SCORED BRICK FORM
of Famous Cornell Cupola Flux makes fluxing of molten iron faster, easier and inexpensive.

You simply toss Famous Cornell Cupola Flux into your cupola with each ton charge of iron, or break off one to three briquettes (quarter sections) for smaller charges. Flux in this form does not blow out with the blast but STAYS in melting zone until entirely consumed, thus insuring fullest efficiency.

● PROFIT BY OUR THIRTY-TWO YEARS OF SUCCESS IN CASTING IMPROVEMENT.

Here's the returns you get for using a little

Famous CORNELL CUPOLA FLUX
in every charge of iron.

REDUCTION IN CASTING REJECTS. Famous Cornell Iron Cupola Flux purifies molten iron, makes it hotter and freer flowing—keeps slag fluid—reduces sulphur, and enables you to pour castings with greatly reduced chilled sides, hollow centers and hard spots, and which are easier to machine.

GREATLY REDUCED CUPOLA MAINTENANCE. Drops are cleaner, bridging over is greatly reduced. By forming a glazed or vitrified surface over brick or stone lining, Famous Cornell Cupola Flux reduces erosion and prolongs the period between patching and replacement.

MALLEABLE FOUNDRIES, with cupola operation, are also sending us order after order in recognition of the important role Famous Cornell Cupola Flux plays in giving their castings a better start.

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Famous CORNELL BRASS FLUX

CLEANSES MOLTEN BRASS even when dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves you considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

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CLEANSES MOLTEN ALUMINUM so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula greatly reduces obnoxious gases, improves working conditions. Dross contains no metal after this flux is used.

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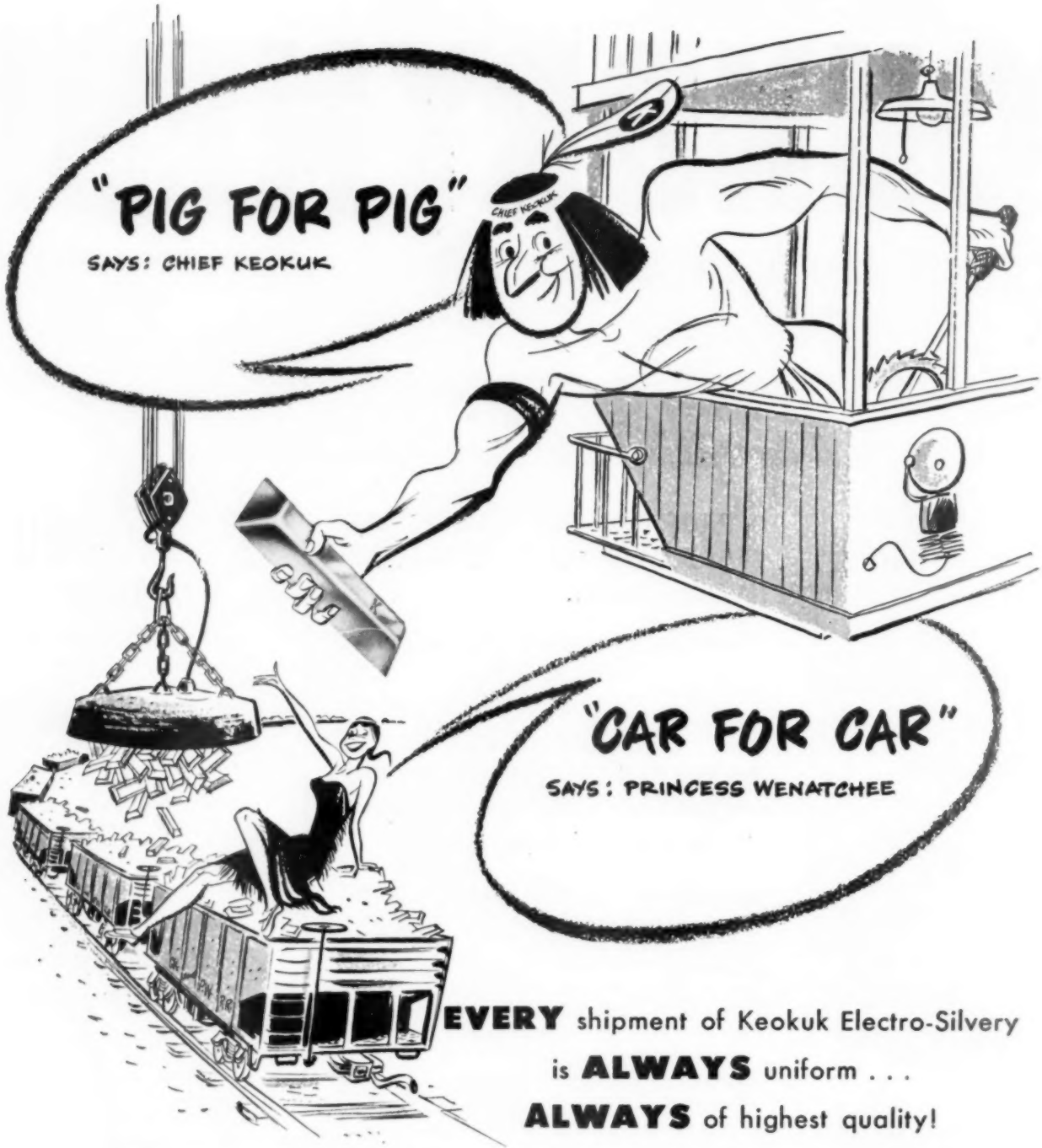
Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918



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Foundry STATISTICS

Index of Foundry Equipment Orders

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1949	1950
Jan.	149.9	159.3
Feb.	144.4	113.1
Mar.	190.8	....
Apr.	172.0	....
May	121.9	....
June	164.9	....
July	146.6	....
Aug.	127.1	....
Sept.	166.6	....
Oct.	133.5	....
Nov.	270.4	....
Dec.	201.0	....

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Foundry Production Workers

ESTIMATED NUMBER

Type Foundry	Dec. 1949	Nov. 1949	Dec. 1948
Iron & Steel	172,300	169,400	231,800
Nonferrous	66,000	62,400	73,400

AVERAGE WEEKLY EARNINGS

Gray Iron	$57.14	$54.35	$59.35
Malleable Iron	57.40	51.14	61.36
Steel	56.91	55.14	62.08
Nonferrous	63.16	61.90	63.51

AVERAGE WEEKLY HOURS

Gray Iron	38.9	37.3	40.9
Malleable Iron	37.3	33.6	40.0
Steel	37.1	35.9	40.6
Nonferrous	40.0	39.1	40.4

LABOR TURNOVER RATE (DEC.)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	4.0	4.8	1.1	3.4
Malleable Iron	2.8	2.6	0.7	1.7
Steel	3.5	2.9	0.5	2.2

Source: Bureau of Labor Statistics.

Ingot Brass and Bronze

(Shipments in net tons)

	1949	1950
Jan.	19,456	18,874
Feb.	15,026	18,487
Mar.	14,550	.....
Apr.	10,695	.....
May	11,114	.....
June	9,696	.....
July	10,220	.....
Aug.	14,194	.....

Source: Ingot Brass and Bronze Industry.

Shipments of Castings

(Reported by Bureau of the Census)

Gray Iron

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1947			
Total	12,540,960	7,181,299	.....
1948			
Dec.	1,110,512	624,739	2,284,348
Total	12,785,909	7,131,405	.....
1949			
Jan.	1,040,343	573,511	2,064,861
Feb.	986,591	535,163	1,857,403
Mar.	1,074,704	567,041	1,639,465
Apr.	929,307	467,433	1,445,532
May	866,631	439,420	1,243,266
June	905,573	455,442	1,086,989
July	696,915	341,657	1,031,963
Aug.	872,013	445,981	1,048,308
Sept.	880,647	459,014	980,070
Oct.	715,685	397,939	955,100
Nov.	718,703	395,107	938,629
Dec.	862,172	440,409	892,458
Total	10,549,284	5,517,527	.....
1950			
Jan.	913,321	449,577	914,185

Steel

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1947			
Total	1,625,055	1,203,504	.....
1948			
Dec.	157,395	116,285	354,458
Total	1,760,032	1,335,295	.....
1949			
Jan.	140,577	103,503	338,889
Feb.	135,042	99,425	320,202
Mar.	138,889	102,027	284,754
Apr.	119,953	83,277	250,506
May	106,178	75,537	191,473
June	116,052	84,112	173,237
July	78,710	50,124	155,494
Aug.	89,964	59,412	143,566
Sept.	86,502	55,853	127,664
Oct.	70,690	48,263	124,817
Nov.	76,437	50,685	117,865
Dec.	84,508	53,079	122,887
Total	1,243,502	865,297	.....
1950			
Jan.	88,821	57,996	142,484

Malleable

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1947			
Total	895,054	513,228	.....
1948			
Total	933,265	525,212	.....
1949			
Jan.	71,876	38,040	126,393
Feb.	66,744	35,074	118,318
Mar.	72,052	38,143	102,379
Apr.	61,329	31,728	94,958
May	54,572	27,643	78,944
June	59,597	32,639	69,865
July	44,360	23,216	70,796
Aug.	58,121	30,327	61,330
Sept.	60,488	30,646	57,512
Oct.	57,150	28,582	54,322
Nov.	49,439	25,250	55,795
Dec.	57,379	29,679	60,835
Total	713,107	370,967	.....
1950			
Jan.	62,874	32,918	62,307
Feb.	60,386	31,249	67,049

Copper-base Alloys

(Thousands of pounds)

	Shipments Total	Sand	Perm. Mold	Unfilled *Orders
1947				
Total	1,051,742	960,732	51,139	.....
1948				
Dec.	88,182	79,750	4,796	53,671
Total	1,030,825	930,790	59,009	.....
1949				
Jan.	76,348	68,379	4,593	48,124
Feb.	68,776	61,278	3,951	40,517
Mar.	70,173	62,557	3,927	37,646
Apr.	59,573	52,837	3,458	32,746
May	53,699	48,004	2,830	30,926
June	52,616	47,678	2,552	26,786
July	43,273	39,372	2,129	26,013
Aug.	58,055	53,203	2,929	26,071
Sept.	60,771	55,221	2,729	26,527
Oct.	58,249	52,861	2,316	23,634
Nov.	61,818	56,669	2,811	23,625
Dec.	63,873	58,291	3,086	23,435
Total	725,318	654,444	37,311	.....
1950				
Jan.	65,585	58,878	3,440	25,216

Magnesium

(Thousands of pounds)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1947			
Total	7,693	7,055	....
1948			
Dec.	754	695	3,455
Total	8,214	7,488	....
1949			
Jan.	822	761	3,821
Feb.	813	756	3,586
Mar.	879	800	3,227
Apr.	726	669	3,234
May	778	726	2,885
June	799	759	3,025
July	689	637	3,073
Aug.	753	712	3,107
Sept.	727	691	3,015
Oct.	796	763	3,050
Nov.	801	769	2,399
Dec.	781	738	2,216
Total	9,364	8,781	....
1950			
Jan.	814	762	2,237

* For sale only.

Aluminum

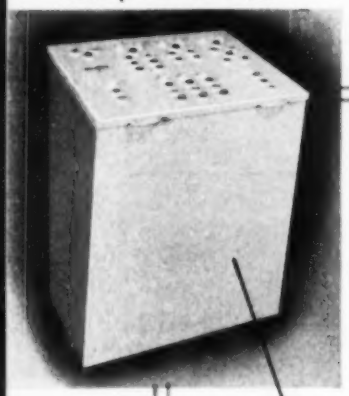
(Thousands of pounds)

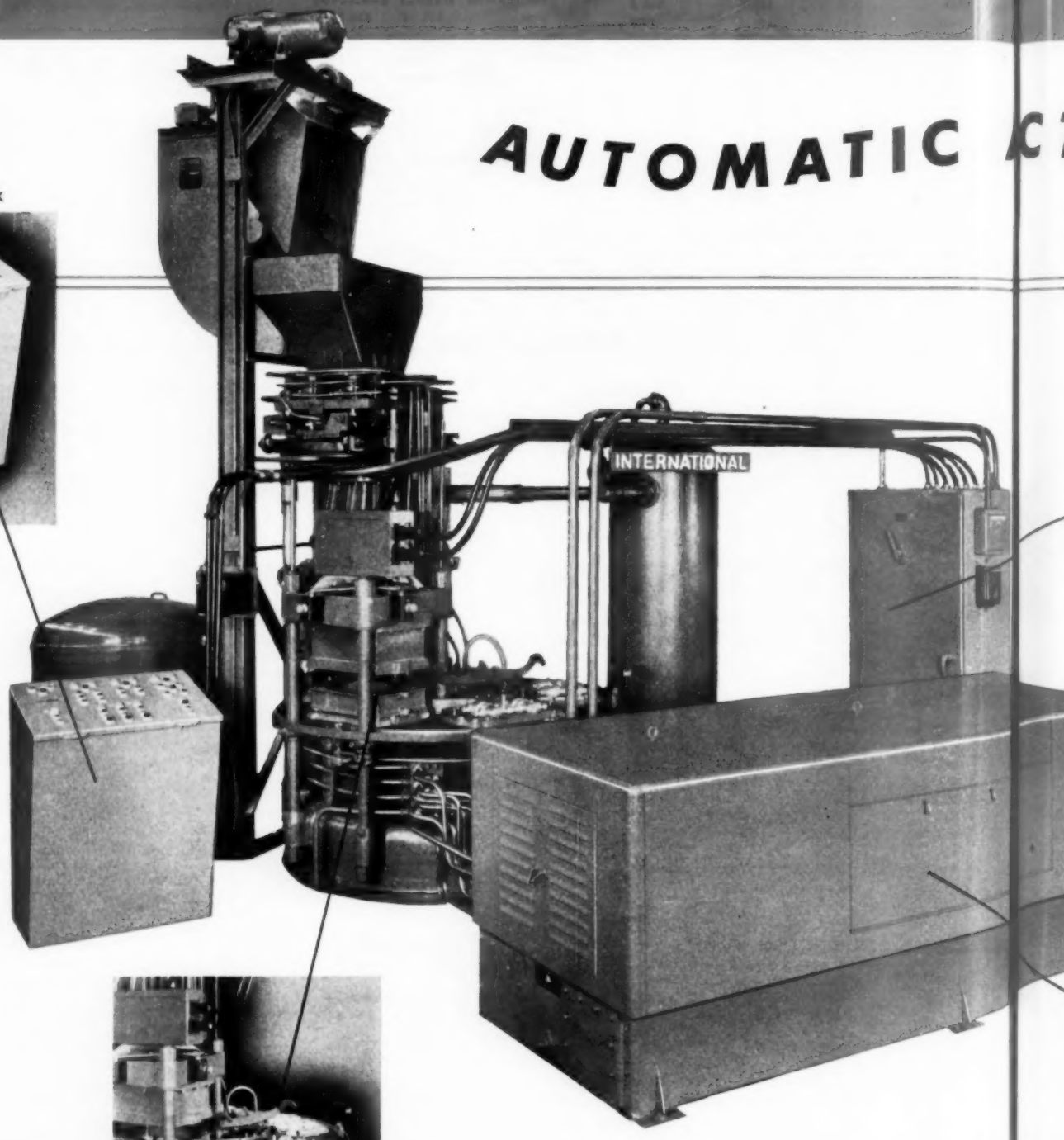
	Shipments Total	Sand	Perm. Mold	Die	Unfilled *Orders
1947					
Total	441,996	155,112	174,515	110,538	.....
1948					
Dec.	31,836	10,335	11,589	9,290	59,154
Total	424,490	139,781	161,334	118,738	.....
1949					
Jan.	29,142	9,702	10,386	8,490	55,580
Feb.	27,228	9,286	9,339	7,795	52,916
Mar.	27,478	9,348	9,386	7,999	50,508
Apr.	23,801	8,041	8,353	6,876	45,638
May	21,392	7,582	7,293	5,994	41,460
June	23,261	8,668	7,790	6,257	38,159
July	18,621	6,311	6,592	5,180	36,993
Aug.	23,997	9,048	8,326	6,119	38,130
Sept.	27,546	9,923	9,491	7,623	38,179
Oct.	29,071	9,634	9,923	8,908	37,881
Nov.	26,317	9,212	8,315	8,348	36,846
Dec.	26,762	10,070	7,714	8,430	36,921
Total	304,616	106,825	102,908	88,019	.....
1950					
Jan.	28,801	9,646	9,400	9,052	40,591

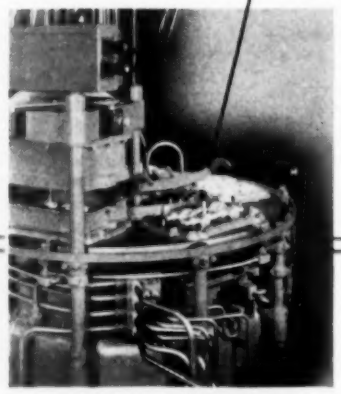
See this INTERNATIONAL M

AUTOMATIC C

Set-up Control Desk







Pattern Mounting

INTERNATIONAL MOLDI

LA GRANGE R

MOLD BLOWER *in Action!*

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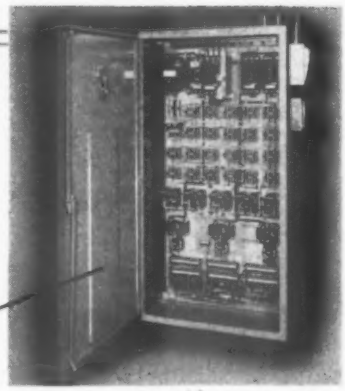
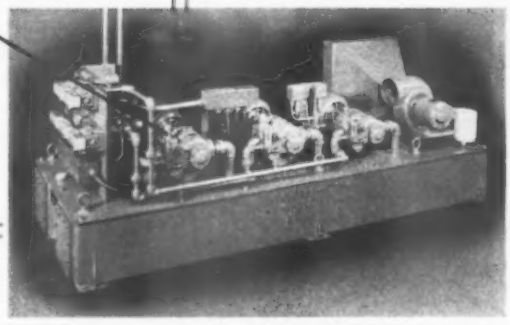


Electric Automatic Cycle Control



Hydraulic Power Unit

AT THE

54th Annual

CONVENTION AND FOUNDRY SHOW

American Foundrymen's Society

Cleveland, Ohio
May 8 - 12, 1950

International Type D Machine

with Automatic Action —

1. Fills Flask with Sand by BLOWING
2. Squeezes mold to proper density of hardness
3. Designed for 12" x 18" flask
4. Fully Automatic Cycle Control — Hydraulically Actuated

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MAN·TO·MAN on the Molder's Bench

"Getting Hurt in the Foundry"

By RALPH L. LEE

I WAS in for one terrific wallop a short time ago. An old shop safety friend of mine mentioned, just as casually as he would the kind of weather we were having, the horrible accident example the foundry set for the rest of industry. What burned me up was that he made this crack as though everyone knew it as a fact.

I reared right up on my hind legs with, "Now you just hold your horses, you're crazier than a loon. You're not going to tell me about the foundry, because I visit oodles of them all over the country. Time and again I've had to put goggles on before they'd let me go through a foundry. I know that gaiters and safety shoes are worn and I have seen safety signs and bulletins hanging up all over. If we were as bad as you say we are, I know darned well the subject of safety would be coming up all the time."

My friend didn't say a word but, with one of those infuriating self-satisfied smirks, he just reached into his desk drawer and pulled out the National Safety Council's annual report. He found the page, ran his finger down the column of industries, listed in the order of their safety record, and sure enough, way down near the bottom, was my pet foundry industry.

It was hard for me to believe this bit of news, for safety was my main job some years back, and I swear that in all my foundry visits and all the shop talks I have had with my hosts, safety was among the missing subjects. Now that I think of it, I was so wrapped up in the problems of molding, melting, cleaning, good housekeeping, good will and selling that I never brought up the subject of safety.

It isn't so surprising that with the little time I have with my hosts on these flying, catch-as-catch-can visits, the subject of accident prevention was sorto' walked around. No matter how you dish it up, safety isn't what you'd call a thrilling subject. It just doesn't have any sex appeal.

Then there's another thing. To be forever harping on safety to a bunch of old-timers who have been in the foundry since hector was a pup and are still all in one piece—well its kinds' like being pestered to be good, so you can get into Heaven some day way off in the distant future. The natural reaction is bound to be: "I don't have to be told morning, noon and night not to hurt myself—after all, it's my hands, arms, legs, feet and life you are talking about."

I have often thought that one of the things that makes an organization-wide safety movement so hard to put over is that, by comparison, accidents are so few and far between that the average fellow hardly ever sees one actually happen. Not having been an eye witness and having gotten by for long stretches without a scratch, it's pretty darned hard for him to get all hot and bothered about some safety drive going on.

But doggone it, when the figures are all gathered together for some outfit, compared with those from some other outfit or pooled together for the industry and then compared with other industries—well, the needless loss of life, limb and time, to say nothing of hard cash, is likely to raise the hair on the back of our necks.

I think all of us will have to agree that if all the accidents which had every right to happen, did happen, we wouldn't have much trouble getting more than enough help to prevent them. But the diabolical thing about it is the way many of us in the foundry get by with murder. Time and again, we know that we and plenty of others do things which by every law should definitely result in an accident but, call it providence, law of averages, luck, guarding angel or someone else looking out for us, we come through unscathed. Then one day things stack up just right for us to get our just dues.

An old foundry owner friend of mine who had been in the business all his life and without a scar, sure pulled one grand boner for which he would have fired an apprentice without batting an eye. They were pouring one of the biggest castings they had ever made, of a high-falutin and expensive bronze. The boys doing the job were all standing around waiting for the metal to cool down a bit. On the inspiration of the moment, what does the boss do but grab a wet stirring rod from out of the corner, jam it down into the crucible and CA-BLOO-EY there was bronze all over the landscape, including the boys. The old man was rushed off to the hospital where he stayed for over two weeks.

Just night before last, I was pulling a long hot casting out of the sand with a pair of tongs even a child would have had better sense than to use. But I was anxious; after three bad attempts in a row I could hardly wait to see whether I had licked the job. One end of the casting sorto' teetered down and barely kissed my hand. I'm carrying around quite a dilly of a scar forming just under my left thumb.

One of the largest explosive manufacturers in the world has a long-standing safety record that a bank would be hard pressed to beat. General Motors for several years hand running has won national honors for an outstanding safety job. There are shops and industrial concerns all over the country proving beyond all

(*Concluded on page* 188)

Announcing—

A COMPACT LOW COST PROVEN *Sand Recovery System*

The NATIONAL SAND DECARBONIZER®

ANOTHER *NEW* NATIONAL product for practical foundrymen, providing a positive sand reclamation method that will pay for itself in approximately one year's time.

Be sure to see the revolutionary NATIONAL SAND DECARBONIZER in action at the 1950 FOUNDRY EXPOSITION in Cleveland, May 8 through 12 . . . Booth 1640.

For full details, send for your copy of the new Bulletin 504 . . . just off the press.

NATIONAL *Engineering Company*

608 Machinery Hall Bldg. • Chicago 6, Illinois

(*Concluded from page* 186)

question of doubt that there is no longer any mystery to reducing accidents almost to the vanishing point.

Such folks say that it takes almost a fanatical, continuous and never lagging interest on the part of every one in an outfit, from the top man clear on through the place to the very back door. Here's a MAN-TO-MAN approach to accident prevention that not only will work, but is working and has been for a long, long time:

1. Analyze every single job in the place, point by point for every single solitary safety do and don't that everyone in the place can think of. Put them down in black and white. (Memory can't be trusted.)

2. Drill every individual who already has such a job, or those about to take such a job, on every one of the points and to be sure he knows each and all of them give him an examination.

3. Every boss, every day, by executive order, check each of his crew against the list and, regardless of the outcome, talk to each on some specific safety point until the entire crew has been checked off.

4. Start all over again and keep on doing it until the day of retirement.

5. Safeguard every piece of mechanical equipment with the best ingenuity the combined brains of the entire outfit can devise and keep it in shape come hell or high water.

6. Hold everybody, from the owner to the visiting clergy, to the rules.

There's one thing I know about this accident-prevention business—it's just like sweeping, buying coke or taking baths, it's a continuous and running, never-ending job. The minute we turn our backs to it, it will up and kick us squarely in the seat of the britches. There's another thing too—one of these hard-to-explain coincidences—we can't possibly do the safety job without helping ourselves in every other department. Profit and safety always seem to run around together.

Forms Separate Corporation

Rice Pump & Machine Co., Milwaukee, formerly a division of Milwaukee Chaplet & Mfg. Co., has been established as a separate corporation. R. D. Houghton, formerly division manager, has been elected president and treasurer. The new corporation will continue to manufacture die filers, profile grinders, sprue cutters for nonferrous foundries, and centrifugal pumps.

OBITUARY

FREDERICK D. RYAN, 57, president, Allyne-Ryan Foundry Co., Cleveland, died suddenly Mar. 18, at Fort Lauderdale, Fla., while on a vacation. Mr. Ryan was born in Oshawa, Ont., and went to Cleveland as a young boy where his father, the late Daniel Ryan, established the foundry about 40 years ago. He entered the business as a young man, served as general superintendent for a number of years, and became president in 1944.

* * *

Henry M. Miller, 82, chairman of the board of directors, American MonoRail Co., Cleveland, died Mar. 16, at his winter home in Hollywood, Fla. Mr. Miller was born in Fairfield, Iowa, and pioneered in the materials handling industry. He was sales manager of the Louden Machinery Co. in Fairfield, prior to going to Cleveland in 1926 to organize the American MonoRail Co., manufacturer of overhead conveying equipment.

* * *

Edward J. Delaney, 85, founder and former president, Delaney Foundry Co., Belleville, N. J., died Mar. 2, at his home there. Mr. Delaney was born in Lansford, Pa., and went to Belleville when a young man and founded the brass foundry which bore his name. He operated the business for 45 years, selling it to other interests when he retired in 1946.

* * *

John F. Patterson Sr., 79, one of the founders and formerly secretary, Lancaster Malleable & Steel Corp., Lancaster, N. Y., died Mar. 27. Mr. Patterson, a native of Cookstown, Ont., was plant manager, Gould Coupler Co., Lancaster, for about 18 years. In 1927 he helped organize the Lancaster Malleable & Steel Corp.

* * *

Edward M. Stroman, 71, president, Metaloy Corp., and the Non-Ferrous Foundry Inc., both of Niagara Falls, N. Y., died Mar. 14, at his home in Buffalo. Mr. Stroman was made treasurer of the Metaloy Corp. in 1938, becoming president two years ago.

* * *

Tor Torsun, 66, who in 1945 retired as foreman of the Lynn, Mass., alloy foundry of General Electric Co., Schenectady, died Feb. 21, at Marblehead, Mass.

* * *

Alphonse O. Rousseau, 61, abrasive products safety engineer, Norton Co., Worcester, Mass., died Mar. 27 following a brief illness. Mr. Rousseau joined the company 43 years ago. Well known for his talks on grinding wheel safety, he was chairman of the safety committee of the Grinding Wheel Institute and a member of its standardization committee. In addition he was secretary of the technical committee on the American Standards Association safety code covering abrasive wheels.

* * *

John H. Miller, formerly superintendent, Josam Products Foundry Co., Michigan City, Ind., died Mar. 30, in Phoenix, Ariz., where he had resided the last 3 years. Mr. Miller was a member of the Michiana Chapter of the AFS while residing in Michigan City, and served as one of its directors.

* * *

Theodore S. Lange, 75, formerly superintendent of foundries for the old Walter A. Wood Machine Co., and Hoosick Foundries, Hoosick Falls, N. Y., died Mar. 14 at his home in North Hoosick, N. Y. Mr. Lange was born in Denmark and came to the United States in 1892.

* * *

Ernest L. Knight, 48, for the past 4 years sales manager, Western Steel Casting Co., Seattle, died Mar. 21. Mr. Knight was previously associated with Pacific Car & Foundry Co., Seattle.

* * *

Clarence J. Dausch Jr., 33, foreman of the foundry department, National Cash Register Co., Dayton, O., died recently. Mr. Dausch joined the company in 1935.

* * *

Raymond T. Mesker, 63, secretary, Aluminum Industries Inc., Cincinnati, died Apr. 8, in Van Nuys, Calif., where he had lived for the past year because of ill health

* * *

James N. Leroy, 81, formerly superintendent of the old Browning Foundry Co., Ravenna, O., died Mar. 28, following a long illness.

* * *

Edward L. Fehring, 67, retired secretary-treasurer, Ohio Pattern Works, Cincinnati, died at his home there Apr. 10.

* * *

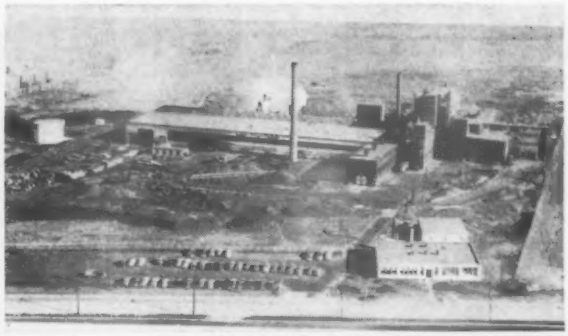
Bert L. Johnson, 56, superintendent, Fremont Foundry Co., Fremont, O., died there Mar. 29, following a short illness.

* * *

Frank L. Scott, 60, owner, Lloyd & Scott Brass Foundry, Wilmington, Del., died Mar. 6.

* * *

Harold A. Kyte, 55, production manager, Homer Furnace & Foundry Corp., Coldwater, Mich., died recently.



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● You are cordially invited to visit National Carbon's booth at the Foundry Show to be held in the Cleveland Public Auditorium, May 8 to 12 inclusive. Drop in for a chat—or just to relax. We'll be looking for you!

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ACHESON GRAPHITE

MARKET DEVELOPMENT CONFERENCE

Held by Malleable Founders' Society

By FRANK G. STEINEBACH
Editor
THE FOUNDRY

BELIEVING that greater demand for castings can be developed through more intensive sales effort, the Malleable Founders Society, in co-operation with the Technological Institute of Northwestern University, staged a market development conference at the Institute, Evanston, Ill., Mar. 22-23. The conference was judged highly successful, with 100 salesmen and sales executives spending two days considering different ramifications of the problem of increasing demand for malleable castings.

William J. MacNeill, Dayton Malleable Iron Co., Dayton, O., and chairman of the market development committee of the society, presided at the sessions. Ralph T. Rycroft, Kencroft Malleable Co., Buffalo, and vice president of the society, opened the first session and paid special tribute to the society movie, "This Moving World," which is doing an excellent job in bringing the properties and applications of malleable iron to the attention of many people, including customers and potential buyers.

In the first paper, Dr. Harry A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, discussed "Characteristics, Limitations and Applications of Malleable." Dr. Schwartz emphasized importance in sales of these properties of malleable iron: Ease of machining; the fact that the higher the strength the greater the ductility; lack of embrittlement; small loss of impact strength at low temperatures, and castability of complex shapes. He stressed the importance of quoted specifications, and pointed out that the customer does not want to know the average value of physical properties in the casting, but rather a value he can use in design with assurance it will be obtained with so few exceptions that the effect will be insignificant and that no detectable failures will occur. In this connection Dr. Schwartz discussed the importance of statistical quality control in reducing deviation of quality or scatter to a minimum.

W. C. Cadwell, general supervisor, materials and quality control, engineering department, Caterpillar Tractor Co., Peoria, Ill., told how malleable iron has lost some business to components produced by welding in a talk "Why Not Malleable? . . . From the Designer's Viewpoint." Mr. Cadwell said there has been no definite movement in the engineering department of his organization to redesign parts to eliminate castings, but emphasized the difficulties experienced in procuring malleable during the war and postwar years.

Technical schools are not securing sufficient information on all types of castings, according to Prof. B. H. Jennings, chairman of the mechanical engineering department, Northwestern University, who spoke on "Your Future Customers." Professor Jennings told of the sketchy and inadequate information he had found in textbooks on mechanical engineering and machine design, and indicated that unless teachers are supplied with adequate information on the product, other forms of fabrication will secure greater recognition because producers have flooded schools with propaganda. More information in the form of pamphlets and engineering data also should be made available to students. He stated that in terms of volume and importance of the malleable casting industry, there is a lack of appreciation by the public and also on the part of technical men who are in position to ask for this material in product design.

D. L. Boyes, sales manager, Central Foundry Division, General Motors Corp., Saginaw, Mich., discussed the present market and potential demand for pearlitic malleable iron. Mr. Boyes defined pearlitic malleable iron and cited some of its important physical characteristics: Good machinability; ability to be selective hardened, and a broad range of physical properties. The speaker said Central Foundry Division increased production of pearlitic malleable iron from 300 tons in 1937 to approximately 20,000 tons in 1949. By the end of 1950 a rate of 30,000 tons a year is anticipated.

Mr. Boyes indicated that sales resistance is encountered due to ignorance of the properties and application of pearlitic malleable iron, because of prejudice and mistrust of castings, because the customer is satisfied with material presently used, and because of tooling costs involved in changing a material. Sales resistance can be overcome by presenting data dealing with present satisfactory applications, by carefully explaining the advantages in using pearlitic malleable iron, by submitting good samples, and by stressing constantly the cost saving factors.

A report of the society's study of

General view of dinner meeting at market development conference of Malleable Founders' Society

Speakers' table at dinner held during the conference includes, left to right: Ralph T. Rycroft Sr., Kencroft Malleable Co., society vice president; W. J. MacNeill, Dayton Malleable Iron Co.; Eugene Mapel, Methods Engineering Council; James H. Smith, Central Foundry Division, General Motors Corp., society president; Cal C. Chambers, Texas Foundries Inc.; Roy C. Hobson, National Malleable & Steel Castings Co.; Lowell D. Ryan, society managing director; D. L. Boyes, Central Foundry Division, GMC

nodular iron was prepared by L. J. Wise, Chicago Malleable Castings Co., Chicago, and presented by W. L. Andriese of that company. This report indicated that a true appraisal of the material's properties, the ability to control production of these properties from day to day and week to week, and other factors including production cost, require more research and study.

Bruce L. Simpson, president, National Engineering Co., Chicago, illustrated a splendid talk on "Creative Selling" with a number of slides showing interesting conversions from other forms of fabrication to castings. A number of these conversions resulted in a reduction in cost through less wastage of metal, less chance of errors in assembly, lower machining expense, lower tool expense, elimination of punching by use of cores, use of patterns instead of dies and jigs, and weight reduction. Improvement in product was a factor because of better appearance of the casting, greater reliability in a one-piece component, and damping properties.

Mr. Simpson related that while his organization has been approached by many producers of components made by welding, forging and stamping, no plain, old-fashioned casting salesman has asked his company for business. He declared that foundries must work together for more business, regardless of metal content. A foundry may have the best technicians, the best metallurgists, the cleverest operator, fine customer relations, good prices and prompt delivery, but this is meaningless unless salesmen and observers report back on what is needed. Without a sales attitude that is forever concerned with the best interests of the customers, the industry will stop cold.

Harold B. Madder, consulting engineer, Houston, Tex., outlined some of the interesting work done in recent years in designing malleable iron castings for use in the petroleum industry. Through lack of understanding and the prejudice against use of malleable castings, selling to this field was exceedingly difficult. However, the challenge was met and now malleable is used extensively throughout the petroleum industry.

Advocates Quality Control

James Rayer, director of quality control, Timken-Detroit Axle Co., Detroit, discussed in some detail the customer's problems in castings procurement. He stressed the need for cleanliness and freedom from sand; proper attention to gating and parting the pattern to avoid difficulties in machining; consistent dimensional accuracy; prevention of pearlitic rim; and detection of defective castings by the foundry inspection department.

Since Mr. Rayer is an enthusiastic advocate of quality control methods, he devoted some time to discussing this fairly recent development and its application to the foundry industry. He indicated that foundrymen have not given the system too much consideration because of the human element involved in the production of castings. Also, foundrymen feel their product is too diversified—too many different types of castings are produced with too many short runs. Nevertheless, applications of quality control to standard foundry practices would raise the overall quality level of all castings. At the same time, there is a tremendous sales and advertising value in quality control.

Mr. Rayer said that Deere & Co. have been using quality control throughout their operations for several years. That company started a quality control program in September, 1948 and in the next 15 months reduced the percentage of hard iron scrap, due to misruns, from 3.65 per cent to 0.7 per cent, and there is every indication that scrap for the first quarter of 1950 will be still lower.

"What a Purchasing Agent Expects of a Malleable Supplier" was discussed by H. A. Manderson, director of purchases, White Motor Co., Cleveland. The speaker said that what is most needed from the foundry industry is co-operation. In recent years the engineers of his organization have specified malleable iron for certain jobs, but, Mr. Manderson pointed out, the company has not been subjected to pressure for a greater use of malleable parts than has been specified. No technical expert has provided information which would increase malleable applications on trucks. The speaker also indicated a need for help in determining if the design of the casting is practical for foundry production.

Mr. Manderson said that the flow of material to the manufacturing plant is very important. Unless schedules are met, or the customer is notified when scheduled shipments cannot be made, proper co-operation is not being given. Mr. Manderson also spoke of the importance of quality of components in the building of a quality product. He stressed the fact that whatever system may be used to maintain the quality of castings, this system must be effective

A comprehensive discussion of creative selling was presented by Prof. R. M. Clewett and Prof. E. H. Stockham, marketing department, College of Commerce, Northwestern University, in a talk, "Marketing Problems of the Malleable Industry." Prof. Clewett said that the factors which must be considered in a sales program include more sales-mindedness, long-range sales planning, improved sales management, and more productive salesmanship. He declared that

top management must be sales-minded; for example, when the particular product of the company cannot be used, an effort should be made to help the customer solve his procurement problem. Eliminating the sales valleys needs customer satisfaction, prospecting, creative selling and diversification of product.

Prof. Stockham discussed marketing research, what it is, various types of research, methods of conducting research, and applications to the field of malleable iron selling. Research covers markets, sales, customers, trend analysis or long range planning, and product analysis. The industry faces two problems in selling—how to increase total consumption of the product and how the individual company may go about increasing its profit. Sales research, in his opinion, is a field for both the individual company and the trade association, while trend analysis probably should be on the association level.

Frank G. Steinebach, editor of THE FOUNDRY, Cleveland, cited some of the problems facing the industry in increasing its market, and pointed to the need of efforts both on a co-operative national basis and by individual foundries. He suggested the importance of a bold sales policy based on an assurance of the ability of the company to make a quality product.

"How to Win Friends and Influence Castings Buyers," a sales interview participated in by Ralph T. Rycroft, vice president of the society, James H. Lansing, Malleable Founders' Society, and Roy C. Hobson, National Malleable & Steel Castings Co., Cleveland, indicated a technical approach to the marketing problem.

This was followed by a panel discussion in which Frank O. Parker, Dayton Malleable Iron Co., Prof. R. M. Clewett, and Frank G. Steinebach endeavored to answer questions dealing with market development in malleable iron. William J. MacNeill was moderator.

Roy C. Hobson, assistant to the vice president in charge of sales, National Malleable & Steel Castings Co., Cleveland, in a talk, "Sales Tools From the Society Workshop," outlined the assistance the society can give individual members. Mr. Hobson stated that this aid is divided into six parts: The film "This Moving World," the handbook on malleable iron, a technical data book which will have a new issue soon, the foundry educational program, the work on quality control, and the publication "Malleable Iron Facts," of which 20,000 copies per issue are sent to an up-to-date mailing list.

Lowell D. Ryan, executive director, Malleable Founders' Society, presented data on the history and trends of the malleable industry. Mr. Ryan stated that the society has 73 members operating 87 malleable plants in 21 states. Membership represents approximately 75 per cent of all malleable iron tonnage, or 85 per cent of the standard malleable tonnage. During recent years, the trend has been steadily toward production in captive shops. In 1942, 17 per cent of production was for own use and 83 per cent for sale, while in 1949, 51 per cent was for sale and 49 per cent for own use. Mr. Ryan outlined ways in which the society can help in sales work and expressed the belief sales can be boosted to 1 million tons a year in the next few years.

W. T. Cole, Canton Malleable Iron Co., Canton, O., speaking on "Measurement of Sales Results," referred to the various methods available for accomplishing that purpose. Measurement lies in improved sales efficiency and results in most men striving for improvement. Personal guidance in most companies helps greatly to provide sales improvements and has been found to boost morale.

Need More Information

Cal C. Chambers, Texas Foundries Inc., Lufkin, Tex., closed the conference with consideration of "Where Do We Go From Here?" Mr. Chambers declared that more information must be provided on malleable castings at the educational level. Greater attention must be given to the importance of casting quality. The industry needs to educate and develop the master salesmen in selling malleable iron, and it must go into new fields and new products, must create new uses and new markets.

Dean Ovid W. Eshbach, Technological Institute, Northwestern University, spoke at the first luncheon on "Development of Engineers for Industry." Dean Eshbach said that while we seem to be living in a period of great stress, we are in reality in a normal age if one can judge a situation from the history of wars, depressions and conflicts in this country. Human beings have not changed. Therefore, the problem of training engineers needs a growing social concept. He expressed an aversion to establishing special courses to solve specific problems, and stressed the importance of co-operative education where the young engineer can learn particular things and visualize the concepts and problems of engineering in industry.

At the second luncheon, Gordon E. Sergant, president, Meneris Co., Chicago, presented an entertaining discussion on "Human Venture." An interesting talk at the Wednesday evening banquet by Eugene Mapel, vice president, sales consulting division, Methods Engineering Council, Pittsburgh, related the way to make a master salesman. Mr. Mapel suggested that in any sales effort these steps are necessary: Make ready, approach with benefits to the buyer, stimulate a desire, tell the facts, eliminate retardants, make the sale.

BRITISH LICENSEE: Cooper-Bessemer Corp., Mt. Vernon, O., recently licensed Harland & Wolff Ltd., British ship and engine builder, to manufacture and sell Cooper-Bessemer compressors to many of the countries now included in the sterling area. Shown above, left to right, are: W. Gilchrest, Cooper-Bessemer foundry superintendent, and Jack Martin, assistant foundryman from the British manufacturing concern

A New Era IN PATCHING CUPOLA LININGS with

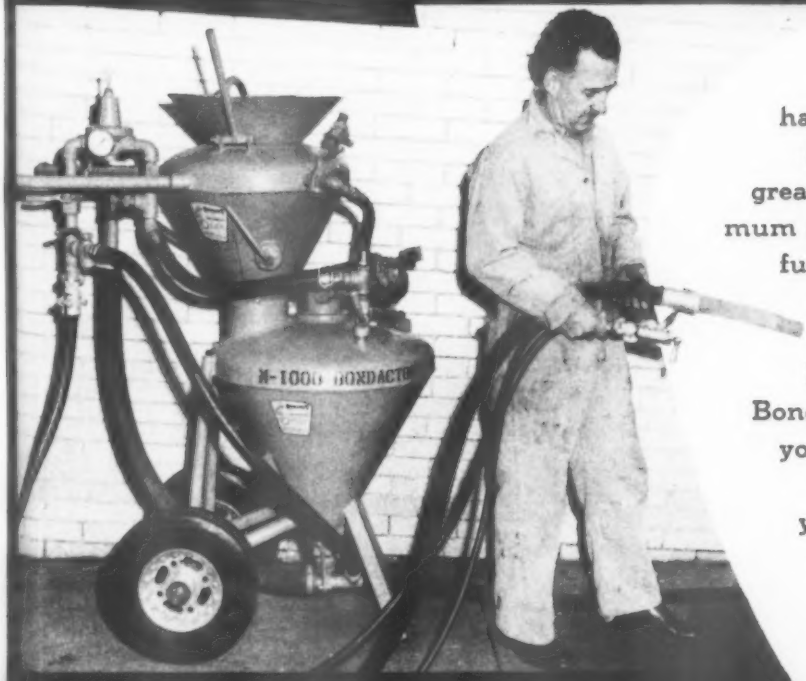
BOOTH 422

The BONDACT Process

See Bondactor • Booth 422 • Cleveland

IT'S NEW . . .
IT'S REVOLUTIONARY . . .
IT'S FAR BETTER

REVOLUTIONIZES
PATCHING and LINING of FOUNDRY CUPOLAS



The Bondactor is a pressurized machine which meters and feeds a dry refractory mixture at almost any desired rate or volume at any location convenient to an air line or air compressor, feeding uniformly and without pulsation.

No more hard and soft spots due to uneven patching! Steady, uniform feeding saves hard manual labor and lines your cupola, ladle or furnace in ¼ to ½ the time heretofore required, greatly reducing down time. Your lining has maximum density and maximum refractory life. You have full control over moisture content, which is low, over density of patch and contour of patch. Extensive aging of monolithic materials is no longer necessary; storage space is reduced. Since Bondactor delivers unusual density and strength, you can use the highest quality ganisters with minimum clay and water content. Finally, you get low burn-out, uniform burn-out per day, uniform melting conditions and better all-around cupola performance. Why not see what the proven Bondact process will do for you and your production costs?

Ask for a copy of our well illustrated 8-page bulletin about the Bondact process.

A *New and Better* REFRACTORY FOR PATCHING CUPOLAS *with* BONDACTOR... *Cupoline*

It's important — this matter of patching cupolas — an essential, not an incidental, in foundry practice. Cheap patching is an extravagance you can't afford. **Cupoline**, a Cone 33 silica base refractory, was developed by scientific research directed by practical experience plus "know-how". Graded and balanced as to fine and coarse, it has maximum density and resistance to slag penetration. Its low clay content permits minimum water in application. If your cupola has been bridging, freezing up, running erratic chill depth, showing high pressures and otherwise misbehaving, give Cupoline a chance. The results may give you a pleasant surprise.

LET *Cupoline* FREE YOUR CUPOLAS FROM THESE HEADACHES

★ ★ ★

Three Methods of Applying CUPOLINE

Cupoline DRY Mix (for hand ramming). Temper, age and ram lightly into place. No joints to burn out — homogeneous patch. No errors in plant compounding, blending or mixing; uniform, scientifically correct mixture.

Cupoline PLASTIC Patching Refractory (for spade tamping). Properly aged — correct water content — no confusing formulae for mixing — ready for use. No weighing, no tempering, no splintered or sharp ganister. Just tamp into place.

BONDACT Mix (for air placement). A dry, screened mix to use in Bondact pressure machine. No need to store dry materials or buy a mixer for patching materials. Optimum combination for air-placement lining and patching.

Let an ECP engineer look into your patching needs now.

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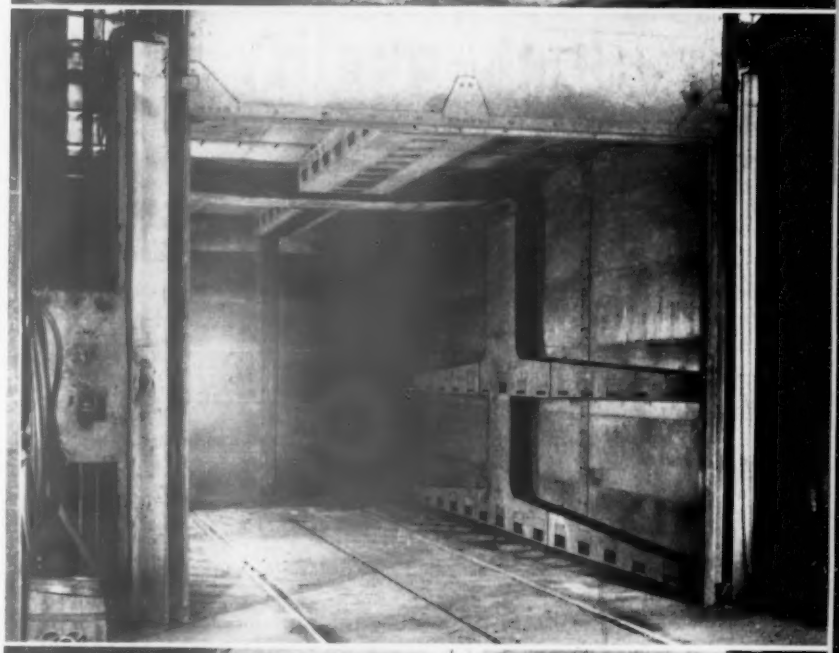
BONDING CLAYS and EXCEPTIONAL HANDLING EQUIPMENT

BONDACTOR EQUIPMENT • CUPOLINE REFRACTORY • DURA PRODUCTS

Automatic Features Incorporated in

NEW Mold Drying Ovens



PICTURED here are views of two new modern drying ovens recently installed in the Oil Well Supply Co.'s foundry located in Oil City, Pa. This U. S. Steel subsidiary manufactures oil country machinery of all types and its foundries produce a wide weight range of both iron and steel castings, many of which are cast in dry sand molds. Through the medium of forced circulation and recirculation of hot gases or products of combustion, mold drying time is reduced to a minimum.

Each oven, having a capacity of 120,000 lb, is loaded by a mold-carrying car permanently connected to an under-the-floor automatic car pulling device, which by means of limit switches, cannot be operated until the oven door is wide open. Heat is produced in a dual fuel combustion chamber on top the oven, with an external mix type burner using either natural gas or fuel oil, the burners being provided with automatic fuel changeover devices as well as shutdown safety devices in case of fuel or power failures.

The combustion chamber, which consists of an insulation-covered stainless steel inner lining encased in a steel housing, is connected to a high-temperature fan of 13,000 cfm capacity, forcing the products of combustion through ducts discharging at floor level along both sides of the oven. The circulated hot gases are drawn out through ceiling ducts and about 70 per cent again go through the combustion chamber and are recirculated.

Prefabricated double wall sections, consisting of 5-in. thick glass wool insulation covered by 14 gage steel sheets, make up the oven walls and ceilings, and reduce firing time to 65 per cent of the mold drying time. The drying time cycle is completely automatic and in addition to the many safety protection devices, there is a delayed time firing device whereby the ovens are completely purged of any residual gases before the combustion chamber is ignited. The units were designed, fabricated and installed by the Carl-Mayer Corp., Cleveland.

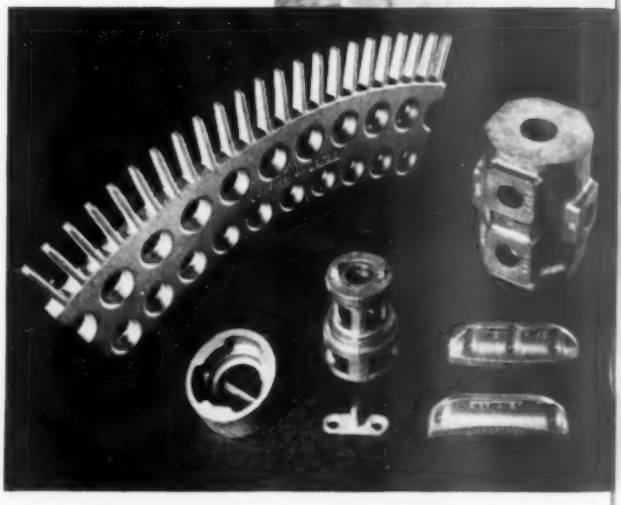
Famous Ampco Alloys start here . . .

Detroit ROCKING Electric Furnaces deliver uniform high-quality melts

AMPCO METAL, INC., of Milwaukee, is famed the world over for its bronze alloy, Ampco Metal, and for other copper-base alloys. It is the foremost copper-base alloy plant in the U. S. specializing in refractory bronze alloys.

Ampco Gets Top Results

Ampco relies on its battery of Detroit Rocking Electric Furnaces to produce high-quality melts economically, to customers' rigid specifications. The rocking or "stirring" action of the furnaces always assures homogeneity. Neutral atmospheres maintained in the chambers minimize oxidation losses and inclusion of oxides in finished castings. Result: Ampco castings are of superior grain structure, show fine surface texture, are uniform in color, and show low scrap loss when machined.



To produce high quality alloys to make castings such as these, Ampco bought its first Detroit Rocking Electric Furnace in 1924 . . . today, Ampco has a huge battery of Detroit Electric Furnaces!

For Ferrous Melting, Too

In ferrous melting operations, too, Detroit Rocking Electric Furnaces positively control composition and quality, and reduce metal shrinkage. Turnings, scraps and machinings are melted profitably, even when *no pigs* are used!

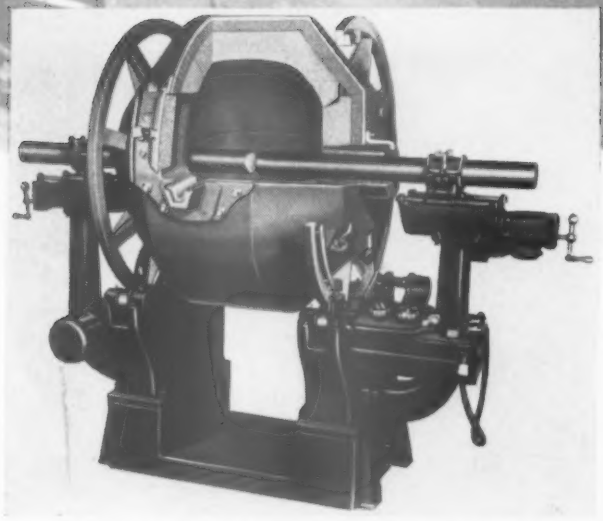
Detroit Electric Furnace rocking cycles are adjustable, and can be pre-set. Duplication of previous melts is remarkably easy. The electrodes always remain clear of the molten bath

Low MELTING COST
High QUALITY CONTROL
FOR FERROUS and NON-FERROUS METALS

for optimum power use, and to avoid carbon pick-up. All-electric operation ends worry over fuel shortages, ends, too, the cost of handling and storing bulky fuels. Detroit Electric Furnaces are available in 10 to 4000 lbs. capacities, with conical or cylindrical chambers which are easily, quickly replaceable.

Write for Savings!

For facts on how you save costs, get more high-quality melts per day, send us your production data. Our engineers will supply facts on Detroit Rocking Electric Furnaces that can save you money in your own foundry operation. Write today!



Cutaway of a Detroit Rocking Electric Furnace showing position of electrodes and the refractory lining. Note thick insulation which retains all the heat for melting, keeps foundry area temperatures low.

DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN

Foreign Representatives: In BRAZIL—Equipamentos Industrias "Eisa" Ltd., Sao Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N. Y., MEXICO: Casco, S. de R. L. Atenas 32, Despacho 14, Mexico City, D. F.

Around DETROIT

Applications of pearlitic malleable iron castings expanding steadily, partly at expense of steel forgings. . . . Trucks are wearing out faster, the result of heavy wartime service

AN excellent idea of the progress made by the Central Foundry Division, General Motors Corp., Saginaw, Mich., in merchandising its pearlitic malleable iron, sold under the tradename of ArmaSteel, was given by D. L. Boyes, director of sales of the division, at the recent market development conference of the Malleable Founders' Society. From a production of 300 tons in 1937, sales have mounted to a point where 1949 production was approximately 20,000 tons valued at around $5 million. By the end of 1950, the company expects to be producing pearlitic malleable at the rate of 30,000 tons a year.

Typical pearlitic malleable castings produced by the division during the past year include washing machine parts, valve rocker arms, transmission shifter yokes, clamps, diesel engine parts, tractor parts, hydramatic transmission parts, hubs, refrigerator parts, camshafts, axle parts, universal joint yokes, machine gun parts and commutator rings.

The company now is working to extend the universal joint yoke and the refrigerator crankshaft business, as well as hydramatic and dynaflow fly wheels. The reverse internal gear for the hydramatic has just been released at the rate of 3000 tons a year. This will replace an SAE 5140 steel forging. The forging was annealed before machining and heat treated after machining. The Arma-Steel part is reheated and oil quenched at the foundry to 3.7-3.9 brinell. No heat treatment by the customer is required and machinability is better than with the forging.

The division estimates that of the average annual production of commercial forgings, approximately 144,000 tons would be of size and analysis suitable for replacement by pearlitic malleable castings. This would be divided somewhat as follows: Autos, trucks and motorcycles 62.4 per cent; tractors 13.1 per cent; agricultural implements 1.7 per cent; railroad equipment 3.3 per cent; industrial equipment 12.1 per cent; all others 7.4 per cent. By far the largest field for expanding use of the material is the automobile industry.

HUGE GEAR: This 23-ton gear, 15 ft in diameter, manufactured by the Falk Corp., Milwaukee, is said to be the largest main propeller shaft driving gear ever made for an American merchant ship. Cast from manganese molybdenum steel, the gear will be installed in American Export Lines' 21,000-ton liner, *Independence*, now under construction at Bethlehem Steel Co., Fore River, Mass. Shown in front of the gear, left to right, are: Louis W. Falk, vice president, Falk Corp.; W. B. Nott, Bethlehem Steel Co., and Stephen Richardson, engineer, Falk Corp.

* * *

TRUCKS appear to be wearing out faster than passenger cars. This is indicated by latest figures of R. L. Polk & Co. on registration of motor vehicles. And it could be an important factor in maintaining sales of commercial vehicles in coming months. The Polk studies show that 1,220,041 passenger cars were taken off the road last year, or 3.45 per cent of the total. Trucks that were not reregistered in 1949 (considered scrapped) totaled 484,038, or 6.4 per cent of the total in operation.

It is believed that the heavy beating taken by trucks during the war helped to speed their demise, while wartime restrictions on gasoline use by passenger cars prolonged the lives of many prewar autos. Figuring scrappage as the potential market for replacement sales, truck builders could look for business from former users at an annual rate of close to 40 per cent of 1949 output. The passenger car replacement market represents only about 23 per cent of last year's production.

Truck builders have had relatively

(*Concluded on page* 201)

PIG IRON FROM TENNESSEE

Dependable quality — dependable deliveries — these are the qualities you get in unmatched degree with Tennessee Pig Iron.

We invite you to test this dependability by placing an order for Tennessee Pig Iron. Choose from two types... DIAMOND "D" Pig Iron is low phosphorous, low-silicon, high-carbon, machine cast . . . ROCKWOOD Pig Iron—malleable and foundry, machine cast.

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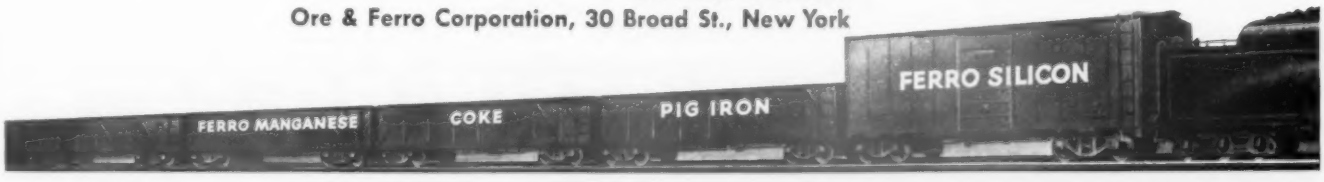
Miller & Co., Chicago, St. Louis, Cincinnati
S. H. Bell Co., Pittsburgh

EXPORT AGENT:
Ore & Ferro Corporation, 30 Broad St., New York

TENNESSEE
PRODUCTS AND CHEMICAL CO.
NASHVILLE, TENNESSEE



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SMITH OIL & REFINING CO

MANUFACTURERS OF L-O AND CERTIFIED CORE OILS

INDUSTRIAL OILS DIVISION . . . ROCKFORD, ILLINOIS

(*Concluded from page* 198)

stable operations since 1946, the first full postwar year. Output of about one million units that year compares with the postwar peak in 1948 of slightly under 1½ million. On the other hand, passenger car assemblies have more than doubled from the 2¼ million level of 1946 to nearly 5 1/3 million in 1949. With almost 40 per cent of the passenger cars now on the road postwar models, it is not surprising that the rate at which they are going to the scrap yard is slowing down and is approaching the prewar yearly average. Over the past 25 years passenger cars have been scrapped at an average rate of 1,601,940 units a year.

The automobile industry realizes that a big share of its market in recent years has been supplied by deferred wartime and immediate postwar buying—a demand which has been satisfied to a large extent. However, it continues to have a potential sales volume of no small proportions in the indicated yearly replacement markets for approximately 1,500,000 passenger cars and 500,000 trucks.

* * *

WHILE THE British have published reports of the development of a jet-powered automobile, experts in this country believe it will be years before that type of propulsion can be applied to the family car. Many technical difficulties are apparent, but the most important has to do with the tremendous heat generated at the exhaust of the jet engines. It is pointed out that the jet blast alone would be sufficiently dangerous and obnoxious to rule the machine from the road. All of this would seem to indicate that the internal combustion engine with cast blocks, heads and in many cases cast camshafts and crankshafts will continue to power the family car and many trucks.

Book Review

Guide for Foreman Training Conferences, paper, 131 pages, 8½ x 11 in., published by the American Foundrymen's Society. Price $2.25.

This guide was developed and approved by Donald F. Lane and the Foreman Training Committee, Educational Division of the society. Mr. Lane, who is supervisor of training, Bethlehem Steel Co., Sparrows Point, Md., also is chairman of the Foreman Training Committee.

The manual was developed to improve supervisory effectiveness of first line foremen in the foundry industry. The authors have attempted to stress not only the economics of the free enterprise system, but also many of the human relations characteristics that are of paramount importance to successful, every-day, sound employee-management relationships. The contents are divided into four separate parts under the following headings: Tips for conference leader in conducting a conference; basic economics; effective leadership; and methods improvement. A set of questions and answers has been appended to each conference outline to bring forth discussion.

Book Review

Symposium on Metal Melting and Casting, cloth, 168 pages, 5½ x 8½ inches, published by the Institute of Metals, London, price $2.50.

This is the report of a symposium on metallurgical aspects of nonferrous metal melting and casting of ingots for working held in London at the annual meeting of the institute in March 1949.

Papers included in the book are: "Melting and Casting of Nonferrous Metals" by G. L. Bailey and W. A. Baker; "Production of Refined Copper Shapes" by R. H. Waddington; "Melting and Casting Aluminum Bronze Ingots for Subsequent Working" by A. J. Murphy and G. T. Callis; "Application of Flux Degassing to Commercially Cast Phosphor Bronze" by N. I. Bond-Williams; "Melting and Casting of Brass" by Maurice Cook and N. F. Fletcher; "Melting and Casting of Nickel Silver at Works of Messrs. Henry Wiggin & Co. Ltd." by E. J. Bradbury and P. G. Turner.

Yearbook Published By FEMA

Foundry Equipment Manufacturers' Association, Engineers Building, Cleveland 14, has published a yearbook marking the 32nd year in the service of the organization to the equipment industry. The publication features the new insignia and the recently adopted motto "A Mechanized Foundry Benefits Everyone."

The book also contains the list of officers, directors and committees, a report of the 31st annual meeting of the association, including papers and reports presented, the constitution of the organization and a membership roster broken down as to firms and products manufactured.

AFS Moves Offices

American Foundrymen's Society has moved its national offices in Chicago to 616 South Michigan Ave. Headquarters had been located for more than 20 years at 222 West Adams St.

CHANGE OF MANUFACTURER: Hyster Co., Portland, Oreg., has taken over the manufacture and sale of turret trucks formerly produced by the Salsbury Corp., Los Angeles. The new line, known as Hyster Salsbury Turret Trucks, includes a pallet truck, tug, platform truck, cargo truck, and auto-loader. All models have 4000-lb capacity. Illustration above shows a platform truck moving a skip load of cast wheels into a foundry cleaning department

Industry BRIEFS

MAJOR Foundry Co., formerly of 2001 North Major St., Chicago 39, on Apr. 1 moved into a new plant at 9300 West Belmont Ave., Franklin Park, Ill. Company now has 25,000 sq ft of floor area, and its modernized facilities for producing gray iron castings include a new 56-in. cupola of 10 tons per hour melting capacity with mechanical charging equipment, new molding machines and a 5-ton overhead crane. R. Hoffman is president and Joseph Goyack is vice president.

* * *

Fort Pitt Malleable Iron Co., Thomson Ave., McKees Rocks, Pa., permanently discontinued operations Mar. 31. It was the only malleable iron foundry in the Pittsburgh area. Officials plan to dispose of company's inventory and production facilities. The plant had 264 employes when operations were suspended because of lack of orders.

* * *

Kennedy Valve Mfg. Co., East Water St., Elmira, N. Y., has purchased the Semler Co., Jeannette, Pa., manufacturer of cast iron pipe fittings. New officers of the acquired company are Charles F. Kennedy, president; J. Lawrence Kennedy and Howard P. Semler, vice presidents, and Thomas S. Turkington, controller.

* * *

Hyster Co., Portland, Oreg., has appointed Northeast Industrial Equipment Co., 303 Binney St., Cambridge, Mass., to handle sales and service of the company's lift trucks, straddle trucks, mobile cranes and their attachments in Maine, New Hampshire, Rhode Island and ten counties of Massachusetts.

* * *

Bison Bronze Foundry Corp. has been formed to operate a foundry business in the state of New York. Directors are: Emil Szirmay and Orrin W. Bryant, 136 Riverside Ave., Buffalo and Elton M. Dale, 144 West Girard Blvd., Kenmore, N. Y.

* * *

Whiting Corp., Harvey, Ill., has acquired the belt and chain conveyor business formerly operated as the Coburn-Foster Conveyor Co., Chicago. Gordon Foster, former president of Coburn-Foster, will head the chain and belt conveyor product group, under A. E. Bottenfield, vice president in charge of merchandise sales for the Whiting Corp. Conveyor equipment will be manufactured at the Whiting plants at Harvey, Ill., and Los Angeles.

* * *

Reynolds Metals Co., Louisville, has appointed three new distributors for pig and ingot products. They are Silverstein & Pinsoff Inc., 1720 North Elston Ave., Chicago; Rochester Smelting & Refining Co., P. O. Box 547, Rochester, N. Y., and Atlas Metal Co., 2651 East 76th St., Cleveland.

* * *

Detroit Gray Iron Foundry, 282 Iron St., Detroit, plans operation of the gray iron foundry of Novo Engine Co., 702 Porter St., Lansing, Mich. The new branch firm would employ 150 to 175 men. Sale of the Novo property for $102,500 has been approved by the federal court.

* * *

Duncan Foundry & Machine Works Inc., 102 West Seventh St., Alton, Ill., has purchased two pieces of property, filling out completely its ownership in the block bounded by Fifth, Piasa and Market Sts. The property was acquired for possible future use.

* * *

Badger Foundry Co., 1331 Eighteenth St., Racine, Wis., plans to move its plant to a building containing 26,000 sq ft of floor space in Winona, Minn., according to Richard Callender, company president. S. F. Frankel is secretary-treasurer of the company.

* * *

Vincennes Foundry & Machine Works, 402 North First St., Vincennes, Ind., on Mar. 24 suffered fire loss estimated at $5500.

* * *

Illinois Clay Products Co., Joliet, Ill., has moved its Chicago office from 608 South Dearborn St. to 208 South LaSalle St., Chicago 4.

* * *

Continental Gin Co., Birmingham, Ala., has opened an office at Room 2407, 220 East 42nd St., New York 17, to handle domestic and export activities of its materials handling and mechanical power transmission machinery. A. Walter Gotta is district manager.

* * *

Brenco Inc., Puddledock Rd., Petersburg, Va., recently organized, is in full production making journal bearings for railroad cars. Currently employing 45 workers, plans call for a 60-worker plant by mid-summer. G. H. Whitfield, Richmond, Va., is president.

* * *

Bell Aircraft Corp., Buffalo, has sold the business of its Prime Mover Division to the newly formed Prime Mover Co., Muscatine, Iowa, subsidiary of the Home-O-Nize Co., manufacturer of home appliances and machinery.

* * *

New Jersey Zinc Co., New York is producing alloys for the die casting industry at its Depue, Ill., plant. Shipments to eastern points will be made from the Palmerton, Pa., plant and warehouse stocks will continue to be carried at Brooklyn, N. Y.

* * *

Dry Dock Brass Foundry Inc., has been incorporated in New York with capital stock listed at 200 shares, no par value. Directors are: Irving Coopersmith, Mae B. Eskenazi, and Abraham Mandel, 277 Broadway, New York.

* * *

Bell Foundries Corp., has been incorporated in New York with capital stock listed at 200 shares, no par value. Directors are: Marion Mlcoch, Mildred Hecht, and David S. Meyer, 521 Fifth Ave., New York.

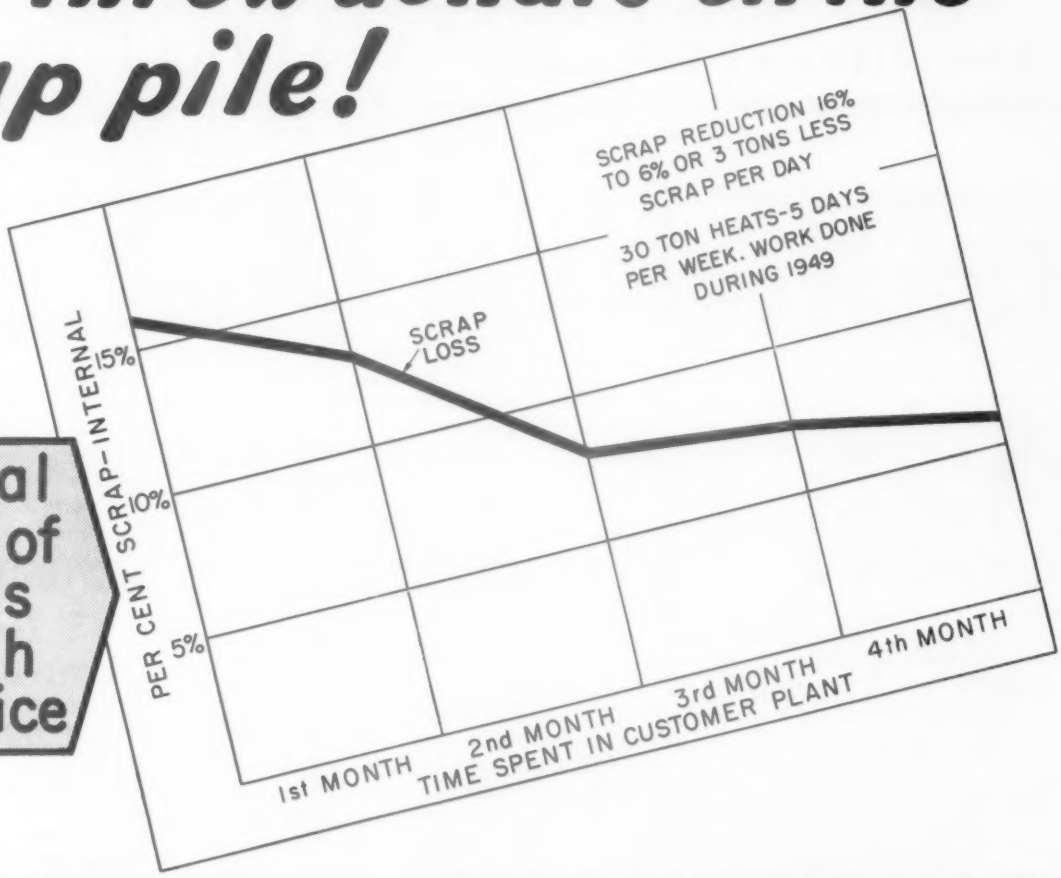
* * *

Mathews Conveyer Co., Ellwood City, Pa., has moved its New York office to 402 Chanin Bldg., 122 East 42nd St., New York 17. L. J. Johnson, engineer there for the company, will be located in the new office.

* * *

Bonham Foundry, 520 South Center St., Bonham, Tex., was destroyed by fire Mar. 14. Company President John Dickey estimated the loss at $100,000.

Don't throw dollars on the Scrap pile!



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Activities of Foundry GROUPS

Western Michigan

PROGRAM of the Mar. 6 meeting of the Western Michigan Chapter of AFS featured Dr. J. A. Ridderhof, manager of the foundry facings department, Frederic B. Stevens Inc., Detroit. His topic was "Core and Mold Coatings." Dr. Ridderhof explained in detail proper mixing procedures and equipment for good coatings and their qualities. This was followed by an interesting discussion period concerning problems the individual members have encountered. Meeting was held at Cottage Inn, Muskegon Heights, Mich., with approximately 90 members and guests in attendance.—*F. W. Beetham, publicity chairman.*

Washington

MARCH meeting of the Washington Chapter of AFS was held at the Gowman Hotel, Seattle, Wash. Election of officers was held and the following will serve during 1950-51: President, Stanley Marshall, Atlas Foundry & Machine Co., Tacoma, Wash.; vice president, James D. Tracy, Salmon Bay Foundry Co., Seattle; secretary, Fred R. Young, E. A. Wilcox Co., Seattle; treasurer, W. R. Tompkins, Western Foundry Sand Co., Seattle. Directors elected include: James Wessel, Puget Sound Naval Shipyard, Bremerton, Wash.; J. F. Dolansky, Griffin Wheel Co., Tacoma, and William Mockey, Everett, Wash.

L. P. Robinson, Werner G. Smith Co., Cleveland, principal speaker, gave a talk on "Cutting Coreroom Costs." It is time, he said, to get down to brass tacks to improve our product, cut costs and save! The foundry industry must be able to meet the change that has come over American business and it must gear for the future to compete with other methods of the metal industry.

To this end he offered the following suggestions for cutting costs in the core room. Check core sand mixing routine. The man at the mixer must be reliable because the success of the foundry operation depends to a great extent upon his ability to turn out uniform core sand. Test core mixtures against performance standards. Find out how much oil is required. Don't use more than necessary just because a mixture decided upon a year ago calls for it—excess binder is costly. Use information supplied by the sand technician to correlate the mixtures to any change in the base sand. Changes in raw materials can be costly if first discovered in a lot of spoiled castings. The "rule-of-thumb" methods must be replaced by precise methods based on sound interpretation of sand data.

He also recommended the following mixing routine which, according to tests, produces up to 40 per cent higher tensile strengths: Sand, dry binder, oxide, bentonite, cereal, water and oil.

Baking is important in the coreroom. In continuous baking, he recommended a time cycle that permits the core to bake in one cycle. A second trip through the oven does the core little good if it cools off at the end of the first cycle. Moisture content influences baked strength as does grain size and shape. High moisture is used to obtain special properties, but Mr. Robinson pointed out it is well to remember that no baking takes place until moisture is driven off, and baking time must be adjusted accordingly. He stressed importance of using mixtures that will make for ease of coremaking. In closing, Mr. Robinson emphasized the theme of his talk—"Exhaust every possibility to be certain that things are being done right in the coreroom!" — *Harold R. Wolfer, Puget Sound Naval Shipyard*

Central Illinois

PRINCIPAL speaker at the Mar. 6 meeting of the Central Illinois Chapter of AFS, held at the Jefferson Hotel, Peoria, Ill., was T. W. Curry, metallurgist, Lynchburg Foundry Co., Lynchburg, Va.

Mr. Curry outlined the use of synthetic resins as experienced by the Lynchburg Foundry Co., which started using them experimentally in 1945. Currently 80 per cent of their core production is with resin sand mixes. This represents 22,000 tons of sand since February, 1948. To date all applications have been in cores for gray iron. A total of 28 resin products by 15 manufacturers have been used experimentally.

In the preparation of mixes, Mr. Curry stated that base sands must be free of clay and bentonite. Baking cycles must be closely controlled, for overbaking cannot be tolerated. Cores are made by blowing, power

(*Continued on page* 206)

WESTERN MICHIGAN Chapter of the AFS met Mar. 6 to hear J. A. Ridderhof, Frederic B. Stevens Inc., Detroit, speak on core and mold coatings. A view of the members and guests is shown above

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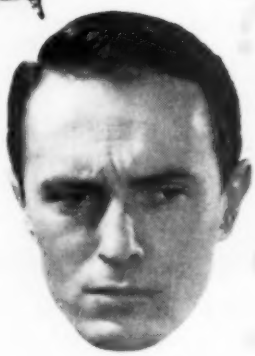

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STOP THE DUST HOG
from stealing profits with

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DUST CONTROL

(Continued from page 204)

and hand rollover, and benches. Sag problems have been a factor in limiting the resin mix to 80 per cent of production. Resin and oil cores made from the same corebox are not totally interchangeable.

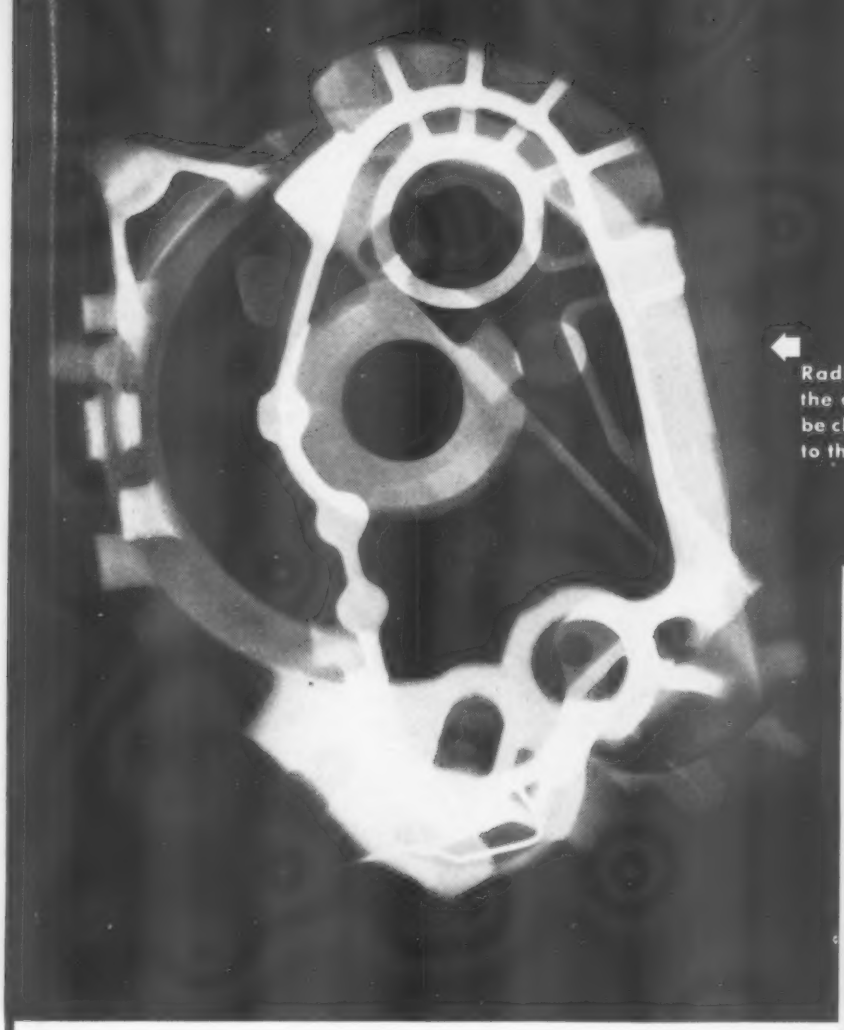
Summarizing advantages of synthetic resin bonded cores, Mr. Curry pointed to reduced cost, shorter baking cycles and improved molding sand control. Disadvantages are the need for refrigerated storage for the synthetic resins, base sands being free from clay and close control of the baking cycle.—*John R. Nieman, Caterpillar Tractor Co.*

Birmingham

AN "Open House" program was staged at the foundry laboratory by the Engineering School of the University of Alabama on Mar. 24 for the foundrymen of the Birmingham district. The visitors saw sand conditioned, molds rammed, cupolas charged, and the molten metal poured. "Safety first," one of the industry's first instructions to its workmen, not only is taught but also is practiced in the foundry laboratory. Goggles, leggings and safety shoes were in evidence as students following the instruction of their instructors caught out the molten metal, shanked it to the molds and cautiously poured a number of them. Overhead cranes with suspended ladles made for easy and efficient pouring of the larger molds. Net results after shaking out, cleaning, grinding and polishing were a number of souvenir ashtrays which were given to the guests.

Following the inspection tour, more than 100 foundrymen and friends gathered at Tutwiler Hall for a banquet at which Dean J. R. Cudworth served as toastmaster. Dr. J. M. Gallalee, president of the University of Alabama, was the speaker. Others at the speakers' table were: W. Newman, dean of administration; Warren Jeffries, foundry practice laboratory instructor; Stephen D. Moxley, American Cast Iron Pipe Co.; Stewart J. Lloyd, dean of the School of Chemistry, Metallurgy and Ceramics; C. P. Caldwell, Caldwell Foundry & Machine Co., chairman of the Birmingham District Chapter; Morris L. Hawkins, Stockham Valves & Fittings, vice chairman of the chapter; C. E. Wright, head of the university's Metallurgical Engineering Department; J. M. Bates, Moore & Handley Hardware Co.; Frank Brewster, Harry W. Dietert Co.; and Fred K. Brown, Adams Rowe & Norman Coal & Coke Co., secretary-treasurer of

(Continued on page 209)



Radiograph showing how the oil passage walls could be checked without damage to the casting.

Cutaway showing oil passage which required accurate and uniformly thick walls.

Only Radiography could check this vital specification

THIS sand cast aluminum housing for a high-altitude air pump included passages to carry oil at very high pressures. Specifications called for passage walls of accurate and uniform thickness.

There was one way to check this important specification—one sure way for the foundry to be absolutely certain of releasing only sound and satisfactory castings. Radiographic inspection was the way.

Radiography is becoming more and more routine with foundries assigned important tasks. On critical castings, such as this, it may be used to assure freedom from core shifts immediately before pouring and as a final casting inspection tool. Most valuable of all, radiography reveals internal defects during the pilot casting stage and suggests the changes needed to assure high yield in the production run.

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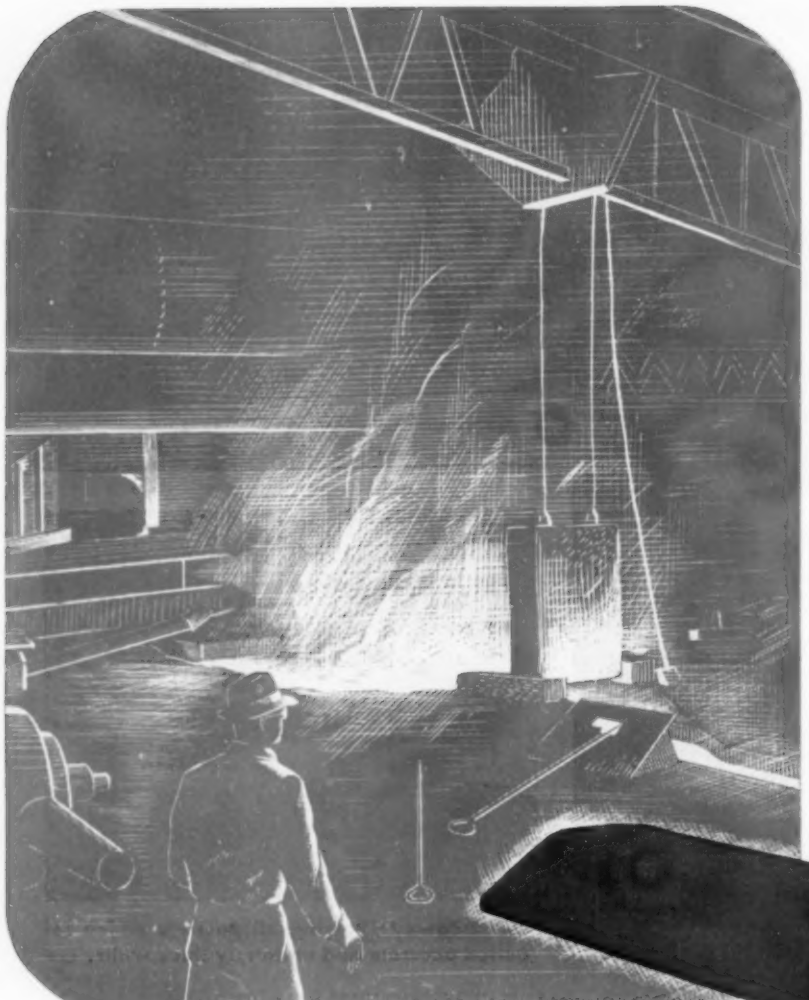

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(*Continued from page* 206)

the chapter.

Prof. Wright, who is responsible for the administration of the FEF program, reported that 32 had attended the three-day sand school which the Birmingham District Chapter sponsored in co-operation with the University of Alabama and which was conducted by Frank Brewster, sales manager for the Harry W. Dietert Co., Detroit—*J. P. McClendon, Stockham Valves & Fittings.*

Wisconsin

A MANAGEMENT meeting was featured by the Wisconsin Chapter of AFS on Mar. 10 at Hotel Schroeder, Milwaukee. Chapter President Robert Woodward, Bucyrus-Erie Co., announced the following nominations for officers and directors for 1950-51: President, W. W. Edens, Badger Brass & Aluminum Co.; vice president, George E. Tisdale, Zenith Foundry Co.; secretary, J. G. Risney, Risney Foundry & Equipment Co.; treasurer, Leon H. Decker, Allis-Chalmers Mfg. Co. New directors: E. C. Meagher, Federal Foundry Supply Co.; M. C. Frankard, Delta Mfg. Co.; Harold Ziebell, Crucible Steel Castings Co.—all for three years, and Robert Woodward for a one-year term.

Principal speaker was Dr. Allen A. Stockdale, whose talk was entitled "Let's Build a Better America." Dr. Stockdale has been staff speaker for the National Association of Manufacturers for the past 12 years and in that time has made more than 3000 talks, both in this country and in Canada. His job is to create a better understanding of the American individual enterprise system by people in every segment of the economy.

The chapter's May meeting will be omitted since it falls during the AFS convention week. The regular Old Timers' party regularly featured in May will be postponed until the second Friday in June.—*John E. Hubel.*

St. Louis

LARGEST attendance of the year was present at the Mar. 9 meeting of the St. Louis District Chapter of AFS. Guests included a group of students from the Missouri School of Mines, members of the student chapter there, who had visited the Key Co., East St. Louis, Ill. that afternoon. Dean Curtis Wilson, head of the Missouri School of Mines, expressed appreciation to the St. Louis Chapter for its help in establishing the AFS student chapter and in helping to furnish equipment for the

(*Continued on page* 212)

WISCONSIN Chapter of the AFS heard an address by Allen A. Stockdale, National Association of Manufacturers, at its March meeting. Mr. Stockdale is shown in bottom view. Photos by W. V. Napp, Badger Firebrick & Supply Co.

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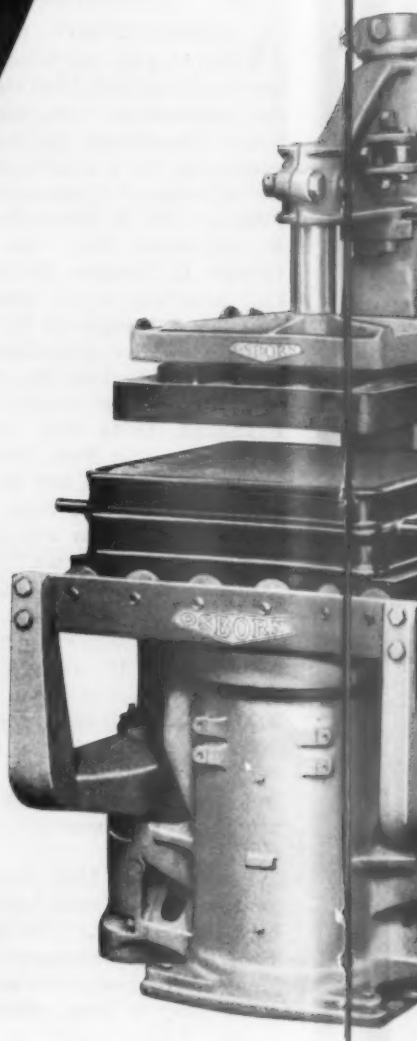

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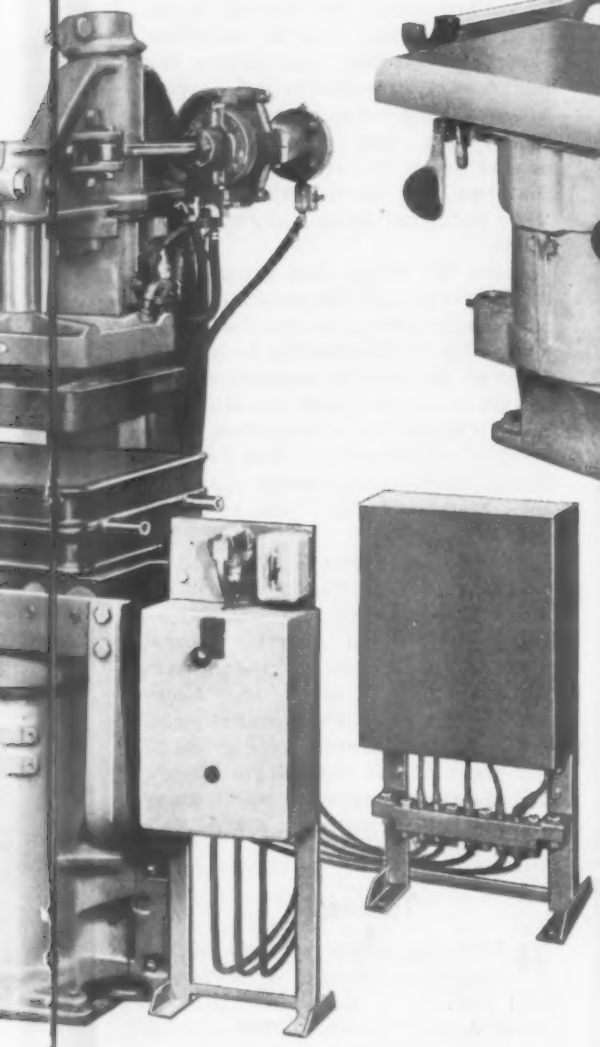

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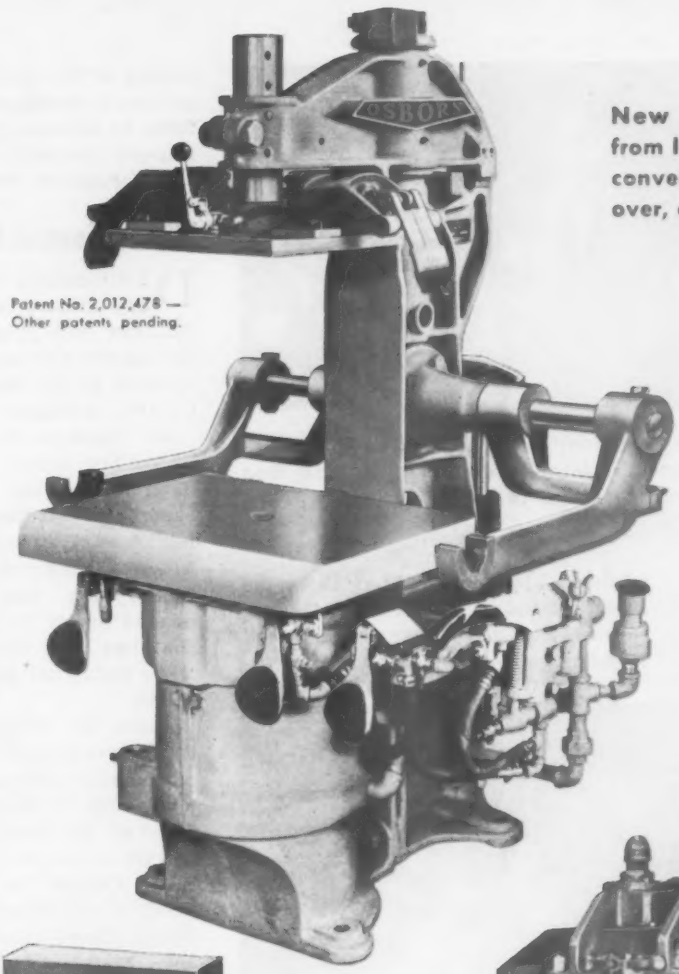

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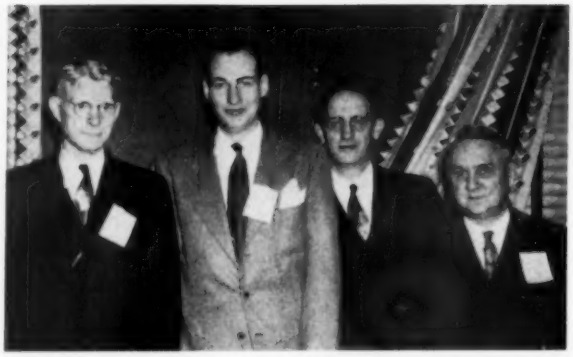

TENNESSEE Chapter of the AFS met at Hotel Andrew Johnson, Knoxville, Tenn., Feb. 24. Shown at the meeting, left to right, are: Dean N. W. Daugherty, University of Tennessee, who received from the chapter on behalf of the university a library of foundry publications; Karl Landgrebe, Wheland Co., Chattanooga, Tenn., chapter chairman; Paul L. Arnold, U. S. Pipe & Foundry Co., Chattanooga, and James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, technical speaker at the meeting

(*Continued from page* 209)

foundry laboratory.

Principal speaker was Frank G. Steinebach, editor of THE FOUNDRY, whose subject was "What Does the Foundry Industry Need?" He expressed need for apprentices and college-trained personnel and also necessity of the various foundry organizations to continue their combined efforts to advance the interests of the foundry industry—*Norman L. Peukert, Carondelet Foundry Co.*

ST. LOUIS Chapter of the AFS heard Frank G. Steinebach, editor, *The Foundry* (upper view) speak at the Mar. 9 meeting. Middle photo shows a group of apprentices who participated in a contest sponsored recently by the chapter. Billy Burgdorfer, Missouri Pattern Works and apprentice committee chairman, is shown in lower center of the photo. Lower view shows the judging of castings submitted by apprentices participating in the contest. Judges were: G. S. French, Semi-Steel Casting Co.; Clee Shy, Banner Iron Works, and Francis O'Hare, Central Brass & Aluminum Foundry, all of St. Louis

Central Michigan

DISCUSSING "Progress in Foundry Sand Practice," Clyde A. Sanders, vice president of American Colloid Co., Chicago, was the principal speaker at the March meeting of the Central Michigan Chapter of AFS.

Mr. Sanders introduced his subject by tracing briefly the history of the development and use of synthetic sands. He stressed particularly the high cost of any addition with respect to natural bonded sands and stated if foundrymen had given naturally bonded sands the study and control that has been given synthetic sands, there would not be as many synthetic sands.

Aided by charts and graphs, Mr. Sanders explained the results of some of the experiments he has conducted and a few of the theories he has arrived at. He recently completed some special work on sands at Michigan State College in collaboration with Prof. C. C. Sigerfoos and others. David Boyd, Engineering Castings Inc., Marshall, Mich., was technical chairman.

The chapter's May meeting will be held at the Union Building, Michigan State College, East Lansing, Mich., May 17. John L. Lovett, general manager, Michigan Manufacturers Association, will speak on "Economics." The chapter's education committee has also arranged for a visit to the plant of the Centrifugal Fusing Co., Lansing, prior to the regular meeting.—*F. P. Tobakos, Albion Malleable Iron Co.*

Tennessee

REGULAR dinner meeting of the Tennessee Chapter of AFS was held Feb. 24 in Knoxville, Tenn., at Hotel Andrew Johnson. The meeting was held in that city not only to make it more convenient for members in the northeastern part of the state to attend, but also to present to the University of Tennessee a complete library of foundry publications for its engineering school.

Chairman Karl Landgrebe, Wheland Co., Chattanooga, presided and presented the library to Dean N. W. Daugherty. The dean expressed the appreciation of the university and said it was a valuable service to the youth of the community for the AFS to make this information available.

(*Continued on page* 215)

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OTTAWA, ILLINOIS

(*Continued from page* 212)

Paul Arnold, United States Pipe & Foundry Co., Chattanooga, vice chairman of the chapter, introduced the speaker, Dr. James T. MacKenzie, American Cast Iron Pipe Co., Birmingham. Dr. MacKenzie illustrated his topic, "Engineering Properties of Gray Cast Iron," with numerous slides and statistics.

On Mar. 9, the chapter was honored with a visit from E. W. Horlebein, president of the AFS, W. W. Maloney, secretary-treasurer, and T. H. Benners, T. H. Benners & Co., Birmingham, a national director. The chapter officers and directors together with top management from the foundries of the area met at a dinner meeting held at the Chattanooga Golf and Country Club. Porter Warner Jr., Porter Warner Industries Inc., reported the chapter's membership is 149. Sam Johnson, educational committee, announced arrangements had been made with the Chattanooga board of education and the Kirkman Vocational School to install necessary equipment for a small foundry to teach fundamentals of foundry technique and practices. The meeting was concluded with remarks by Mr. Horlebein, Mr. Maloney and Mr. Benners.—*Carl A. Fischer Jr., Fischer Supply Co.*

Ontario

CLOSING the current season of the Ontario Chapter of AFS, almost 300 members and guests attended Past Chairmen's Night. Six past chairmen were present and in addition, Walton L. Woody, National Malleable & Steel Castings Co. Cleveland, and national AFS vice president attended the meeting. Other visitors were E. N. Delahunt, Warden King Ltd., Montreal, Que., a national director of AFS, and J. H. Newman, Newman Foundry Supplies Ltd., Montreal, chairman of Eastern Canada Chapter.

The following officers were elected for 1950-51: Chairman, M. N. Tallman, A. H. Tallman Bronze Co. Ltd., Hamilton, Ont.; vice chairman, R. H. Williams, Canadian Westinghouse Co. Ltd., Hamilton; secretary-treasurer, George L. White, Westman Publications Ltd., Toronto. Directors elected to serve three years; George R. Winkworth, Toronto Foundry Co. Ltd., Toronto; Fred J. Rutherford, Refractories Engineering & Supplies Ltd., Hamilton; Charles A. Thompson, Galt Malleable Iron Co. Ltd., Galt, Ont.; Thomas Lyons, Empire Brass Mfg. Co. Ltd., London Ont. Directors to serve two years: Harvey Miller, Walker Metal Products Ltd., Walkerville, Ont.; O. A. Davis, Canada Metal Co. Ltd., Toronto; Charles H. Johnston, E. Long Ltd., Orillia, Ont.; Alexander Pirrie, Gurney Foundry Co., Ltd., Toronto. Directors to serve one year: John Perkins, Ford Motor Co. of Canada Ltd., Windsor, Ont.; A. C. Boak, Non-Ferrous Casting Co., Toronto; A. Reyburn, Massey-Harris Co. Ltd., Brantford, Ont.; J. Richardson, William R. Barnes Co. Ltd., Hamilton; and immediate past chairman, J. H. King, Werner G. Smith Ltd., Toronto.

Past Chairman James Dalby, presided at the technical session. The speaker was E. H. Kindt, president, Kindt-Collins Co., Cleveland, whose subject was "The Promotion of the Pattern Industry." Mr. Kindt outlined the kind of pattern shop required to fill present day pattern requirements. He also dealt at length with the proper method of figuring pattern costs and stressed importance of considering the cost of the end product rather than the initial pattern equipment. An educational program in pattern selling and engineering also was strongly advocated. The speaker remarked that standardization is a tough problem but should be tackled vigorously as a means to improvement with resultant economy. Following Mr. Kindt's talk, a movie of pattern materials and the making of pressure cast pattern equipment was shown.—*Charles H. Johnston, E. Long Ltd.*

QUAD CITY Chapter of the AFS heard a talk by L. P. Robinson, Werner G. Smith Co., Cleveland, at the March meeting. Shown above, left to right, are: E. P. Closen, John Deere Planter Works, Moline, Ill., chapter chairman; Mr. Robinson, and H. A. Rasmussen, General Pattern Corp., Moline, chapter vice chairman

Quad City

COST cutting in the coreroom proved to be a timely subject, judging by the attendance at the March meeting of the Quad-City Chapter of AFS. The speaker, L. P. Robinson, Werner G. Smith Co., Cleveland, presented an interesting and entertaining talk. The coreroom in many instances is a glaring ex-

(*Continued on page* 218)

CENTRAL OHIO Chapter of the AFS had two speakers, both from Columbus, O., at its meeting Feb. 13 at the Chittenden Hotel, Columbus. At left is Prof. D. C. Williams, Ohio State University, who spoke on the subject of "Sand." At right is J. H. Jackson, Battelle Memorial Institute, who supplied the narration for the AFS-Battelle movie, "Fluid Flow in Transparent Molds"

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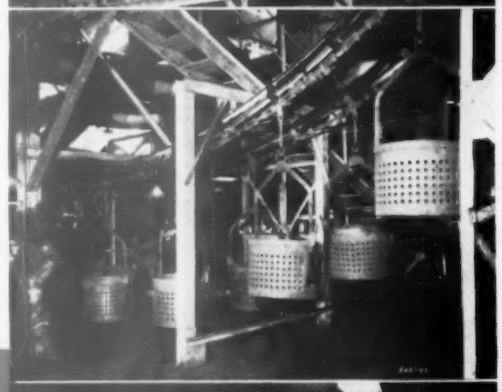

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(*Continued from page* 215)

ample of waste. Often too much material is used due to bad proportions. All dry materials should be mixed first, then water and finally oil added. If this sequence is not followed, the correct proportions may not be sufficient and result in waste.

At the February meeting of the Quad-City Chapter, B. C. Yearly, assistant manager, National Malleable & Steel Castings Co., Chicago, discussed gating and feeding of malleable castings.

In explaining his gating theory, Mr. Yearly referred to a law of science which states: The carrying ability of a fluid is equal to the cube of the velocity. This justifies basins of larger area to reduce velocity and settle out dirt. More cleaning can be insured by placing baffle cores in the riser. Improper feeding creates a vacuum within the casting, pulling in the wall. This shrink spot varies in location and such an occurrence is a possibility when the cope is humped and the drag has a hot spot of sand. Normal change of volume in metal upon solidification is 3 per cent, however each 100 degrees of superheat increases the shrink 1 per cent.—*R. E. Miller, John Deere Planter Works*

New Jersey

NODULAR cast iron is rapidly broadening commercial horizons for castings, but a foundry that hasn't its present operations under good control, should move slowly in entering the field. This warning was issued by Max Kuniansky, vice president and general manager, Lynchburg Foundry Co., Lynchburg, Va., and a past president of the AFS, at the regular monthly meeting of the New Jersey Foundrymen's Association, Military Park Hotel, Newark, N. J., Mar. 20.

Presenting a sound-motion picture of operations at the Lynchburg plant, Mr. Kuniansky referred to various controls essential for efficient foundry operation. Also, he stressed close attention to personnel training. Special interest, he believed, should be directed to development of foremen. They should be given the viewpoint and responsibility of management and be provided with the full picture with regard to costs and selling prices to make them properly cost-conscious. Their attitude toward the men under them should be one of "guiding, not driving."

Interestingly, he said that all of his company's skilled mechanics have been trained within the organization and that the company has never

(*Continued on page* 220)

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(*Continued from page* 218)

gone outside for such help. He advocated time studies, saying that such apply to more than 90 per cent of Lynchburg's operation. He pointed out this is especially important now that "we are face-to-face with competition again."

John L. Carter, association secretary, reported on business activity, and announced that the association's annual summer outing will be held in June. Michael Hogan has been appointed chairman of the committee in charge.—*B. K. Price*

Central New York

PRINCIPAL speaker at the Mar. 10 meeting of the Central New York Chapter of AFS, held at the Onondaga Hotel, Syracuse, N. Y., was W. C. Rudd, chief engineer, Induction Heating Corp., Brooklyn, N. Y. Mr. Rudd discussed "The Dielectric Baking of Cores," covering many problems encountered in the development of the process and the research work necessary in developing the thermosetting resin binders used.

The speaker pointed out that cores are cured in minutes instead of hours with dielectric equipment. Properties obtained in conventionally cured cores could be duplicated by the dielectric methods, although cores of varying heights and those needing nails or chills require special attention. Following the talk, Mr. Rudd showed a series of slides illustrating installations. The pictures showed the equipment, methods of handling and the variety of work that can be accommodated.

Chapter Chairman J. F. Livingston, Crouse-Hinds Co., Syracuse, N. Y., presided and introduced Dr. F. R. Morral, Syracuse University, who invited foundrymen to a series of talks on various methods for testing metals to be given at the university on Wednesday evenings.

L. D. Wright, U. S. Radiator Co., Geneva, N. Y., and a national director of AFS, discussed plans for the coming AFS convention in Cleveland and invited all present to attend.—*J. A. Feola, Crouse-Hinds Co.*

CHESAPEAKE Chapter of the AFS held a buffet dinner meeting at the Engineers Club, Baltimore, in February. Views of the meeting shown here

METROPOLITAN Chapter of the AFS heard Thomas E. Eagan, Cooper-Bessemer Corp., Grove City, Pa., (at right in the photo) discuss "Practical Aspects of Nodular Iron" Mar. 6. At left is C. L. Lane, Florence Pipe Foundry & Machine Co., Florence, N. J., technical chairman at the meeting. Photo courtesy of John Bing, Metropolitan Refractories Corp.

TEXAS Chapter of the AFS met at the Texas State Hotel, Houston, Tex., Feb. 17. Shown above at the meeting are, left to right: Charles McGrail, Texaloy Foundry Co., San Antonio, chapter chairman; W. E. George, Booz, Allen & Hamilton, Chicago, speaker; P. B. Croom, Houston Pattern Works, Houston chapter secretary, and W. H. Lyne III, Hughes Tool Co., Houston, chapter vice chairman. Photo courtesy of C. E. Silver, Texas Electric Steel Co.

Texas

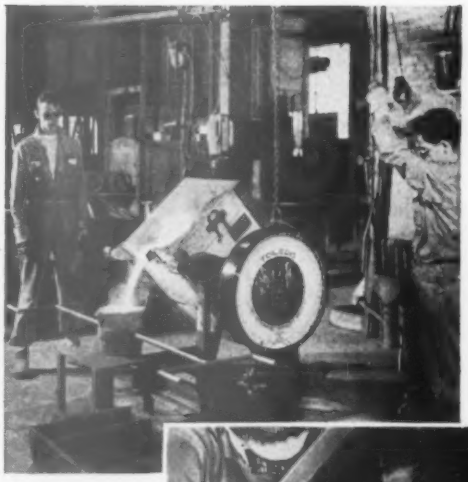
FOUNDRY Cost and Planned Profits" was the subject of the talk by W. E. George, Booz, Allen & Hamilton, Chicago, at the Feb. 17 meeting of the Texas Chapter of AFS. The meeting was held at the Texas State Hotel, Houston, Tex., and was attended by 75 members and guests. Charles McGrail, Texaloy Foundry, San Antonio, Tex., and chairman of the chapter, presided at the meeting. Mr. George was introduced by W. H. Lyne III, Hughes Tool Co., Houston, who is the chapter's vice chairman and program director—*E. P. Clarke, American Wheelabrator & Equipment Corp.*

Chesapeake

FEBRUARY meeting of the Chesapeake Chapter of AFS, held at the Engineers' Club, Baltimore, featured a talk on "Pressure Cast Aluminum Match Plates." Speaker was Raymond C. Huntoon, Pressure Match Plate Co. Inc., Philadelphia, who stated that the product is made by

(*Continued on page* 222)

FOR *Precision Casting*



Melting alloy iron for centrifugal casting at Koppers Company, Piston Ring Division

Pouring super-alloy from 300 lb. Ajax-Northrup furnace at Mercast Corporation

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(*Continued from page 220*)

forcing aluminum under pressure into a plaster mold. This results in good definition and fine finish. Gates and runners may be cast on the plate or added later after foundry practice has been established. The talk was illustrated with slides and actual samples of master patterns, core plugs, plaster molds and match plates.—*Jack H. Schaum, National Bureau of Standards*

Canton

NOMINATIONS of officers and directors to serve during 1950-51 were announced at the Mar. 2 meeting of the Canton District Chapter of AFS held at the University Club, Akron.

Officers nominated are: Chairman, Thomas W. Harvey, Pittsburgh Valve & Fitting Division of the Pitcairn Co., Barberton, O.; vice chairman, C. B. Williams, Massillon Steel Castings Co., Massillon, O.; secretary, Dale Crumely, the Pitcairn Co., Barberton; and treasurer, Fred Basler, A. P. Greene Fire Brick Co., Canton.

Speaker at the meeting was Norman A. Birch, American Brake Shoe Co., Meadville, Pa., who discussed risering. The Firestone Tire & Rubber Co., Akron, also presented a motion picture of rubber growing in Liberia.—*Alexander Prentice, Stark Foundry Co.*

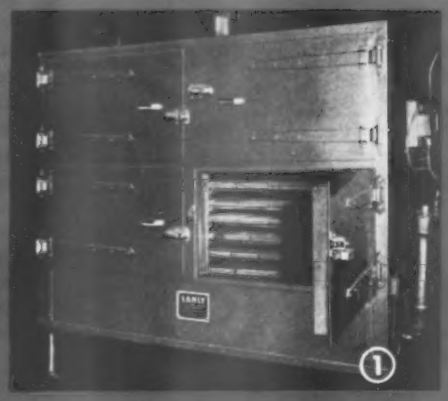
Twin City

MORE than 60 members and guests attended the meeting of the Twin City Chapter of AFS held Mar. 14 at the Covered Wagon, Minneapolis. Robert P. Schauss, Illinois Clay Products Co., Chicago was the speaker on the subject "Gating and Feeding of Castings."

Mr. Schauss outlined these three considerations in the satisfactory solution of a gating problem: The metal should flow through the gating system with a minimum of turbulence and a choke effect should be maintained to prevent the entry of dirt and slag into the mold cavity; the metal should enter the mold so that the temperature gradients, produced on the surface of the mold and in the molten metal within the cavity, are directional toward the feeders; the gating and feeding should be commercial.

With regard to feeding, the speaker suggested these methods to supply molten metal to compensate for shrinkage: Metal which solidifies during the filling of the mold cavity will automatically receive sufficient metal to compensate its volume change; one section of a casting may draw

(*Continued on page 224*)



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Some Typical LANLY Ovens

FIG. 1 — A Lanly Shelf Type Core Oven. This unit is heated by means of burners located directly under the work chamber. Available in several standard sizes.

FIG. 2—A Two Compartment Car Type Mold Drying Oven. Each compartment individually heated and controlled.

FIG. 3 — A Rack Type Oven which accommodates two racks side by side with a single set of doors. Installed where space limitations do not permit separate openings for each rack.

FIG. 4 — Three Compartment Rack Type Oven is equipped with combination oil gas burner equipment. The change from oil to gas or vice versa can be made in a few minutes.

FIGS. 5 & 6 — A Combination Shelf. Drawer and Truck Type Oven. Heat is furnished by one efficient Lanly forced convection system.

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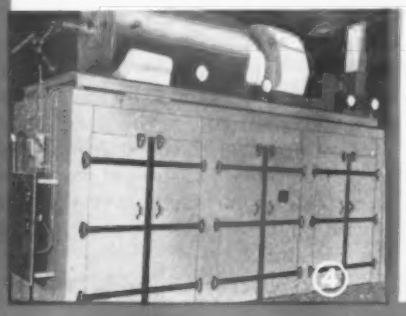

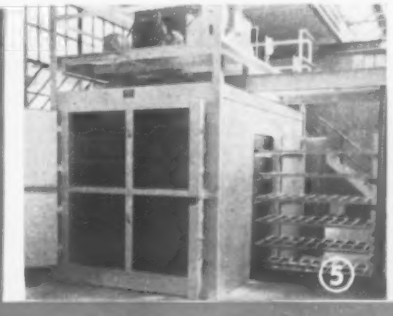

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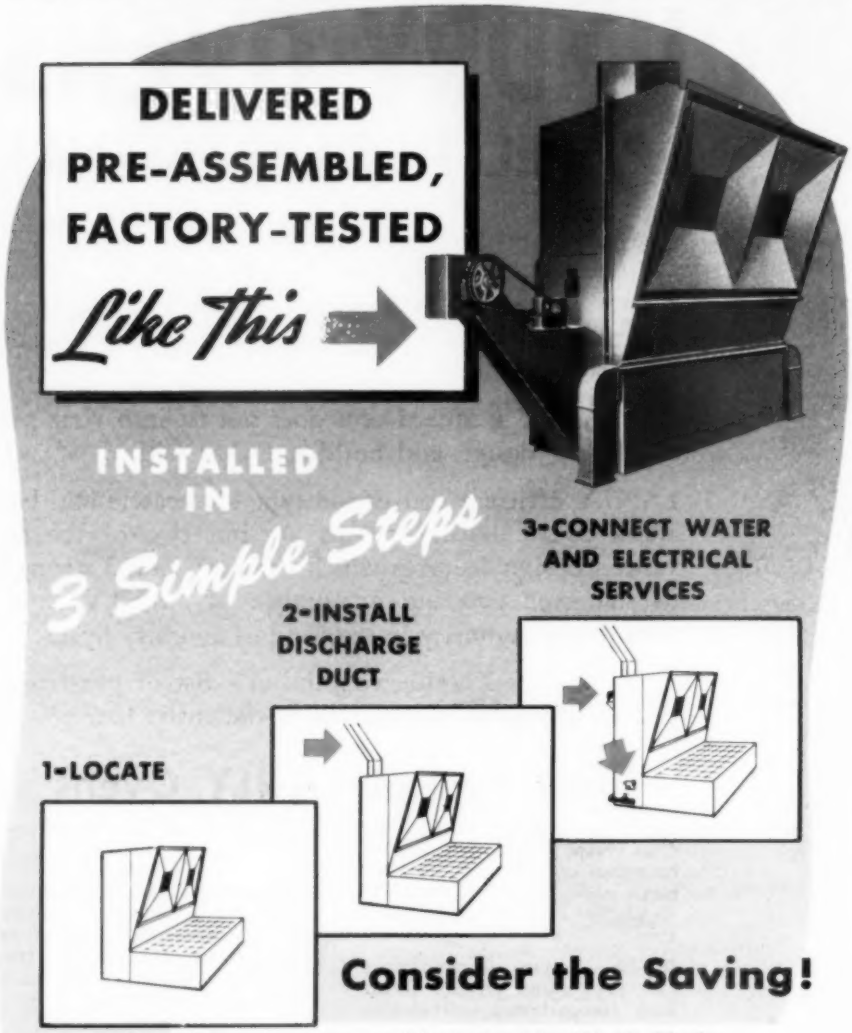

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(*Continued from page 222*)

liquid from another section if the rate of solidification of one section is more rapid than the rate of solidification of the other section; external reservoirs (feeders or risers) may be used, but the rate of solidification of these must be slower than that of the section they are feeding. Additional feeding ideas were presented and explained, including the use of the William's feeder and "necked-down" risering.—*J. D. Johnson, Werner G. Smith Co.*

Philadelphia

MARCH meeting of the Philadelphia Chapter of AFS was held at Franklin Institute, Philadelphia, and was attended by more than 300 members and guests.

Dr. G. H. Clamer, president, Ajax Metal Co., Philadelphia, introduced the speaker, J. B. White, one of the first aerial newsreel cameramen, who exhibited his historic newsreel films dating back to the inception of the newsreel in 1894. Included were scenes of the inaugural parade of President McKinley, first bathing beauty contest, Theodore Roosevelt and his Rough Riders returning from the Spanish-American War, and many other humorous and serious historical photos of America during the past 50 years.—*Albert J. Saute, American Engineering Co.*

Western New York

AT the Mar. 3 meeting of the Western New York Chapter of AFS, held at the Sheraton Hotel, Buffalo, 85 members and guests attended. Speakers were Earl R. Pierce, president, and Alexander H. Colwell, vice president, Exothermic Research Products Inc., Buffalo.

John R. Wark, Wark Foundry Services Inc., Buffalo, and chairman of the chapter, presided and introduced the technical chairman, Lynford C. Roberts, sales manager, Combined Supply & Equipment Co., Buffalo.

Mr. Pierce discussed production of plastic patterns, mentioning that this method of making patterns had been tried in the past but for many reasons met with little success. He conceived the idea of curing plastic at room temperature by using a catalyst which sets in 5 minutes. There is no shrinkage and setting speed can be controlled by the amount of catalyst used in the mix. Some patterns can be removed from molds in five minutes. Pictures of coreboxes, etc., made from plastic material were shown and samples displayed after the meeting.

(*Continued on page 226*)

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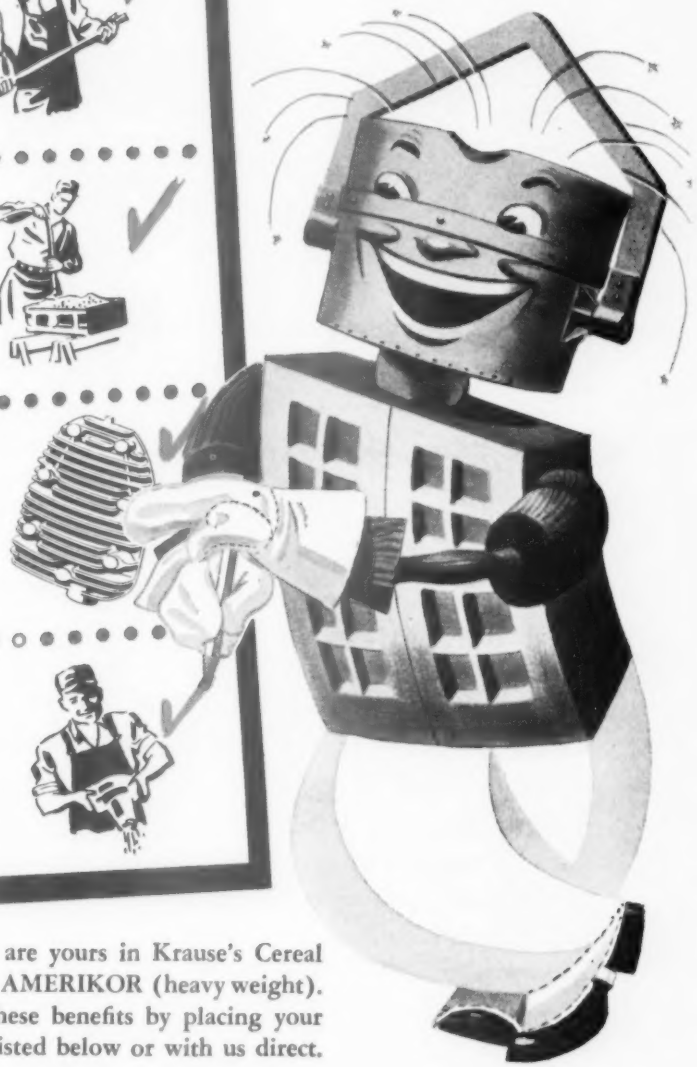

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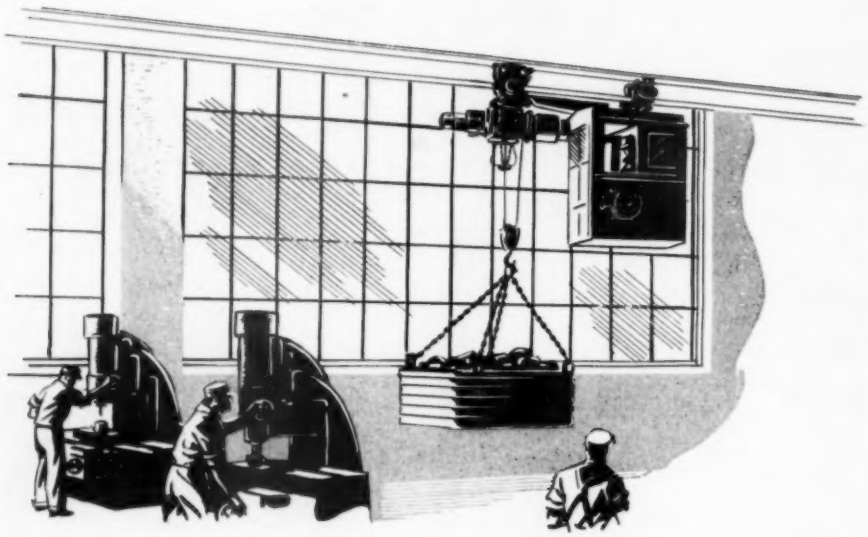

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(*Continued from page* 224)

Mr. Colwell introduced his talk by defining exothermic action as that which gives off heat. Certain types of exothermic materials are used in foundries to delay cooling or hold the heat when put on top of risers, thus maintaining temperatures and promoting directional solidification. The speaker explained methods in using exothermic materials according to the size of riser, volume, wall area in various ratios, and the results that can be expected.—*Roger E. Walsh, Hickman, Williams & Co.*

Chicago

INDICATIVE of the general interest in nodular cast iron, Chicago Chapter, AFS, turned out 250 strong on Apr. 3 at the Chicago Bar Association to hear Charles K. Donoho, chief metallurgist, American Cast Iron Pipe Co., Birmingham, Ala., review production and application progress of this new foundry product.

Mr. Donoho, who is regarded as one of the country's leading authorities on nodular iron, devoted the major portion of his address to a metallurgical review of the development, the three methods of nodulizing by use of cerium, magnesium and calcium additions, and physical properties and characteristics of the irons obtained.

Chapter President W. D. McMillan, chief metallurgist, Farm Implement Division, International Harvester Co., Chicago, presided at the general portion of the meeting and Robert P. Schauss, foundry engineer, Illinois Clay Products Co., Chicago, served as technical chairman and introduced Mr. Donoho.

Preparatory to election of 1950-51 officers at the May 1 meeting of the chapter, nominations were reported by Past President Fred B. Skeates, foundry superintendent, Link-Belt Co., Chicago. Nominations are: President, A. W. Gregg, consulting engineer, Whiting Corp., Harvey, Ill., the present vice president; vice president, Chester V. Nass, vice president, Pettibone Mulliken Corp., Chicago; directors, John A. Rassenfoss, research metallurgist, American Steel Foundries, East Chicago, Ind., Cecil F. Semrau, operating metallurgist, Illinois Malleable Iron Co., Chicago, and E. E. Henry, foundry superintendent, Hammond Brass Works, Hammond, Ind.; and secretary-treasurer to succeed himself, George J. Biddle, sales department, Illinois Clay Products Co., Chicago.

The May 1 meeting at the Chicago Bar Association will feature round-table discussions.

(*Concluded on page* 229)

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Streamlined throughout. Easy to keep clean
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Jolt timer, adjustable to any number of jolts. Built into column
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HERE ARE THREE GOOD REASONS why it pays to purchase NORBIDE pressure blast nozzles:

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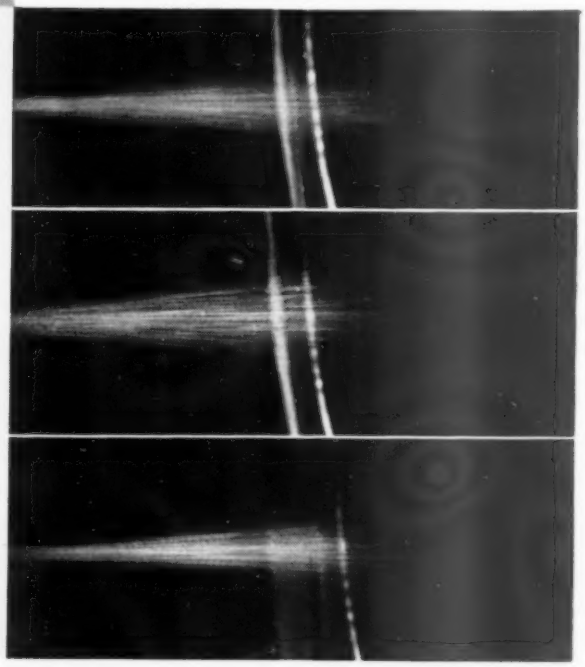


High-speed photograph of stream from new iron nozzle—note that stream concentration and abrasive velocity and volume are fair

Stream from the same nozzle after three hours with silica sand. Outlet opening worn to twice original size—stream concentration poor, abrasive velocity and volume low

Stream from Norbide Nozzle after 404 hours with sand—outlet diameter worn only 0.032"—hundreds of hours of useful life remain—marked stream concentration—high abrasive velocity and volume

(*Concluded from page* 226)

Three roundtables comprised the agenda for the Mar. 6 meeting of the Chicago Chapter, AFS, at the Chicago Bar Association.

The steel and pattern divisions jointly sponsored one roundtable at which Chester V. Nass, vice president, Pettibone Mulliken Corp., Chicago, spoke on "What the Foundry Expects from the Pattern Shop." H. K. Swanson, owner, Swanson Pattern & Model Works, East Chicago, Ind., was chairman.

George W. Anselman, foundry superintendent, Woodruff & Edwards Inc., Elgin, Ill., addressed a joint meeting of the gray iron and malleable divisions, his topic being "Analysis of Casting Defects." Officiating as chairman was Robert P. Schauss, sales engineer, Illinois Clay Products Co., Chicago.

Nonferrous division presented William E. Wyatt, sales director, Pekay Machine & Engineering Co., Chicago, who discussed "Sand Handling and Conditioning for Brass Foundries." E. E. Henry, foundry superintendent, Hammond Brass Works, Hammond, Ind., presided.—*Erle F. Ross and Howard C. Tuttle.*

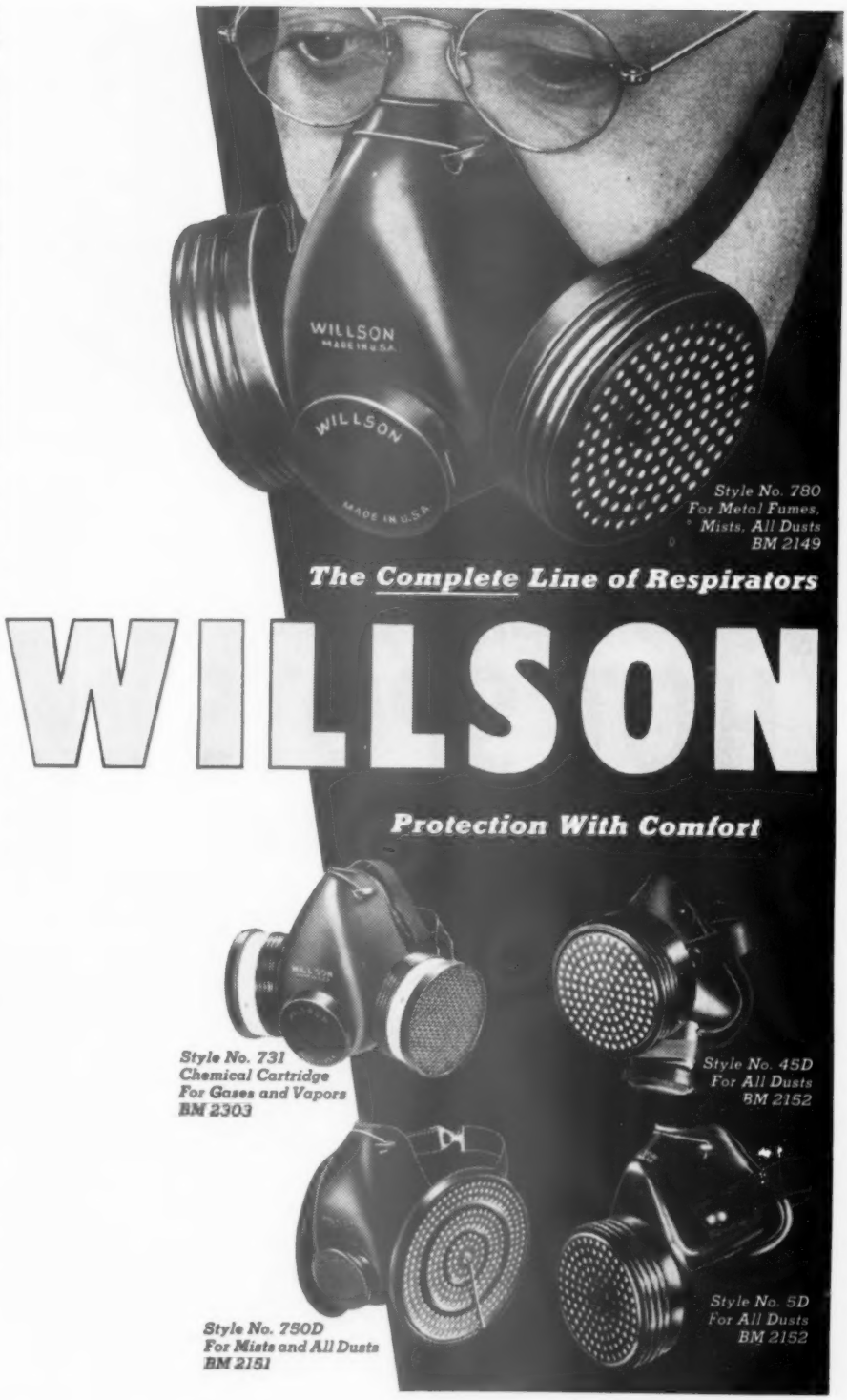
Reading

A DISCUSSION of problems common to handling brass and aluminum was one of the features of the Mar. 21 meeting of the Reading Foundrymen's Association held at the Berkshire Hotel, Reading, Pa. R. A. Colton and D. L. LaVelle, research metallurgists of Federated Metals Division, American Smelting & Refining Co., were the speakers. In the absence of T. E. Eagan, who had been scheduled to speak on "Nodular Cast Iron," W. R. McCracken of the Cooper-Bessemer Co., Grove City, Pa., addressed the ferrous foundrymen of the association on that subject.—*W. I. Cassidy, secretary*

Eastern New York

THREE Naval Research Laboratory movies were shown and discussed at the Mar. 21 meeting of the Eastern New York Chapter of AFS held at Circle Inn, Lathams, N. Y.

Covering the subject of "Gating," the first film illustrated the problem generally while the second was on finger gating and the third dealt with step gating. These movies are a part of an investigation to determine the best way to gate a particular casting to insure uniform flow of metal into the mold with minimum turbulence, thereby helping to produce a better casting.—*George Danner, American Locomotive Co.*



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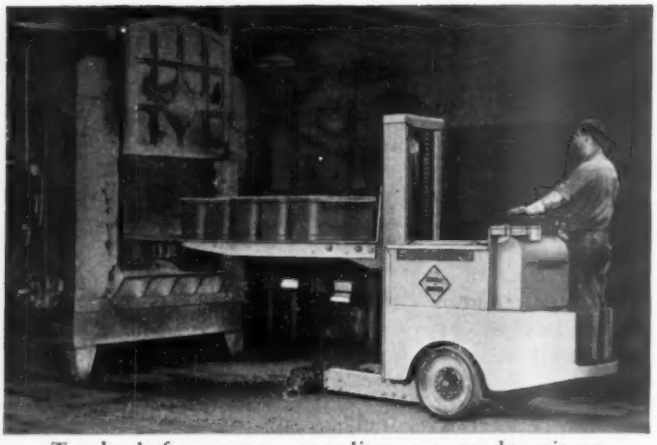

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and ROBERT H. HERRMANN
THE FOUNDRY

CINCINNATI Chapter of the American Foundrymen's Society was host to approximately 300 foundrymen at the successful third annual Ohio Regional Foundry Conference held at the Netherland Plaza Hotel, Cincinnati, March 10-11. Co-operating in arranging the program were the University of Cincinnati and the Canton District, Central Ohio, Northeastern Ohio and Toledo chapters of the AFS.

Quality control, the conference theme, was emphasized at the opening general session Friday morning, presided over by Edward H. King, the Hill & Griffith Co., Cincinnati, who was general chairman of the conference. Walter Klayer, Aluminum Industries Inc., Cincinnati, was meeting co-chairman. In welcoming the conference visitors, Dr. Raymond Walters, president, University of Cincinnati, emphasized the important stake which industry has in education. He said that the latter must have help if further progress is to be made, inasmuch as education as a whole is facing its worst financial crisis in a half century. The big need is to provide the means for training the brains which are available. He added that if industry will help do this job, it will be unnecessary to depend on Washington for assistance.

Two papers on the subject of quality control completed the opening program. L. G. Mitten, industrial engineering department, Ohio State University, discussed the subject in general, pointing out what quality control will and will not do. General procedures in use of a quality control program, including the employment of histograms, were described.

Quality control methods in use at the G.H.R. Foundry Division, Dayton, O., were explained by Harry Placke of that company. Quality control standards have been established as a means of checking dimensions, weight and hardness of castings, slag control, and sand properties. Specific instances of improved quality and reduction in rejected castings were cited.

The Friday noon luncheon, presided over by Edward H. King and Walter Klayer, had Fred Smith, personnel manager, William Powell Co., Cincinnati, as the principal speaker. Mr. Smith said business management is spending too much time catching instead of pitching, and that its greatest challenge is to present its story to the working man. The latter, he pointed out, wants security, a fair share of the available money, personal recognition, and a reason to exercise pride in his company and his boss.

At the Saturday luncheon E. W. Horlebein, national AFS president, and W. W. Maloney, national AFS secretary, gave brief talks preceding L. A. Danse, supervisor, Materials and Processes Production Engineering Section, General Motors Corp., Detroit, principal speaker.

Mr. Danse discussed recent developments in the foundry industry and made some forecasts of developments to come. He berated both foundrymen and foundry equipment and supply manufacturers for their slowness in developing and using new equipment and methods.

First of two talks at the opening gray iron session was on "The Cupola—Its Raw Materials and Operation," by B. P. Mulcahy, Fuel Research Laboratory Inc., Indianapolis. Mr. Mulcahy's paper was presented in the February and March issues of THE FOUNDRY. Chairmen of this session were Sam Clow, James B. Clow & Sons, Coshocton, and Martin Milligan, Lunkenheimer Co., Cincinnati.

For the second discussion, at which Dr. D. C. Williams, Ohio State University, and Joseph Schumacher, the Hill & Griffith Co., presided, gating and risering was the subject of a highly practical presentation by Harry W. Kessler, general manager, Sorbo-Mat Process Engineers, St. Louis. Mr. Kessler sketched the best methods for gating specific castings, with

Some of the conference speakers at the various technical sessions

(Conference photos by W. H. White, Jackson Iron & Steel Co.)

Ohio conference views show: At top, the opening conference session. The Friday luncheon gathering is second from top. Next is a group from the University of Cincinnati. L. A. Danse, General Motors Corp., Detroit, who spoke at the Saturday luncheon is shown at bottom left. At bottom right is Dr. Raymond Walters, president, University of Cincinnati, opening day speaker

special reference to design of pouring basins, dimensions of down gates, and arrangement of runner bars and ingates. The size of the riser used, he pointed out, depends on the class of iron being poured, since shrinkage varies with each grade.

Second gray iron session, was directed by A. W. Schneble, Advance Foundry Co., Dayton, O., and Martin Rollman, Cincinnati Milling Machine Co., Cincinnati. Tom Barlow, Eastern Clay Products Inc., Jackson, O., spoke on "Quality Castings Require Good Sand Practice," and said that to have sand control one should know the minimum and maximum limits of sand properties under which satisfactory results are obtained. Without such information it usually is difficult to determine the necessary changes to bring the sand back to proper working conditions when defects appear.

Tests in Small Foundry

Concluding gray iron talk related to controls and tests for quality castings in the smaller foundry. Speaker was A. D. Barczak, Superior Foundry Inc., Cleveland, and co-chairmen were J. D. Judge, Hamilton Foundry & Machine Co., Hamilton, O., and Stanley Levy, Keuthan Division, Black-Clawson Co., Middletown, O.

Mr. Barczak said that while elaborate controls and tests employed by large establishments are too costly for smaller foundries, certain controls can be administrated by the latter. One is careful checking and preparation of the pattern. Another is checking of raw materials to see that they meet the requirements and are used properly through various tests. Castings should be taken off the line hourly for inspection. All castings made in one day must be cleaned, sorted and rough inspected by the end of the following day. Foremen and employees must check out their scrap, and the scrap record posted. Records also are kept of castings returned by the customer, and monthly checks are made to ascertain whether improvement is being made.

At the first of three malleable iron sessions, John Manos, Lake City Malleable Co., Cleveland, and Arthur Grimm, Dayton Malleable Iron Co., Dayton, Ohio, presided. The first paper discussed the effects of oxidation in cupola melting on the annealability of malleable iron, and was presented by Milton Tilley, metallurgist, National Malleable & Steel Castings Co., Cleveland. Text of Mr. Tilley's paper is presented in this issue, starting on page 142.

F. W. Dixon, the Haven Malleable Castings Co., Cincinnati, presided at

(*Continued on page* 234)

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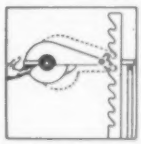

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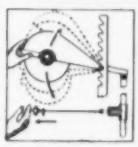

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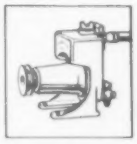

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(*Continued from page* 232)

the second part of the session at which the speaker was Robert O. Mayer, assistant general manager of the same company. Mr. Mayer discussed general details of direct air furnace melting of malleable iron.

The concluding paper, "Zirconium in Malleable Iron," was prepared by John Varga and Howard Bleil, Case Institute of Technology and Lake City Malleable Co., Cleveland. Specimens from standard malleable iron test bars containing zirconium were used to determine the annealing time at the upper critical for each zirconium content. Examination of the microstructures showed that the time necessary for complete solution of cementite at the upper critical was increased with increased amounts of zirconium. The specimens examined for second stage annealing effects were normal with respect to completion at the second stage.

First paper in the second malleable iron session was presented by Gordon B. Mannweiler, metallurgist, Eastern Malleable Iron Co., Naugatuck, Conn. John Manos and Robert O. Mayer were co-chairmen.

Mr. Mannweiler stated that pearlitic malleable irons are comparatively new and offer greater strength values at a sacrifice of elongation over standard malleable iron. The production process varies in different foundries, but the end product is similar, being a microstructure of temper carbon nodules dispersed in a pearlitic or sorbitic matrix.

Melting is done in the several types of furnaces common to malleable iron production. Batch melting practice utilizes air, open hearth, or electric furnaces, or duplexing from cupola to air or electric furnaces. Composition of the metal as tapped usually is: Total carbon 2.20-2.75 per cent; silicon 0.90-1.70; manganese 0.25-1.35; sulphur under 0.20; phosphorus under 0.20; copper up to 1.00, and molybdenum up to 0.50.

Both malleable and pearlitic malleable irons are cast as white iron. The pearlitics are heat treated at some temperature above the critical for varying times depending upon such factors as melting practice, iron composition, annealing temperatures, and section size.

Mr. Mannweiler then described a number of the methods of producing a pearlitic matrix in iron with chemical composition the same as standard malleable. He also discussed use of manganese as an additive to stabilize eutectoid carbides but which has little effect upon the breakdown of massive carbides during the first stage of the anneal. He described the annealing practice for such an iron.

Dickey Dyer, Dyer Engineers Inc., Cleveland, presented the concluding malleable iron paper entitled "Consolidating Estimating and Costing Through Effective Control." Co-chairman was F. W. Dixon.

Mr. Dyer explained that estimating takes place before a foundry receives an order; costing takes place after an order has been delivered. In his opinion, substantial savings can be obtained by consolidating the two functions. He terms the new method "Pre-costing."

The method determines costs in advance of performing a job based on data proven correct by past operations. The system is based on the creation of certain operating conditions controlled by measurement of human effort, whether productive, nonproductive, contributory, supervisory or managerial, as the basis for incentive pay. Standards are expressed for workers in terms of time standards and for management in money budgets.

Incentive Is Joint Effort

Standards and incentives for labor are more successful when accompanied by budgets and incentives for supervisors and managers, according to the speaker. He found that under incentive systems, 80 per cent of the benefits are derived from efforts of supervisors and management, the balance from labor's efforts.

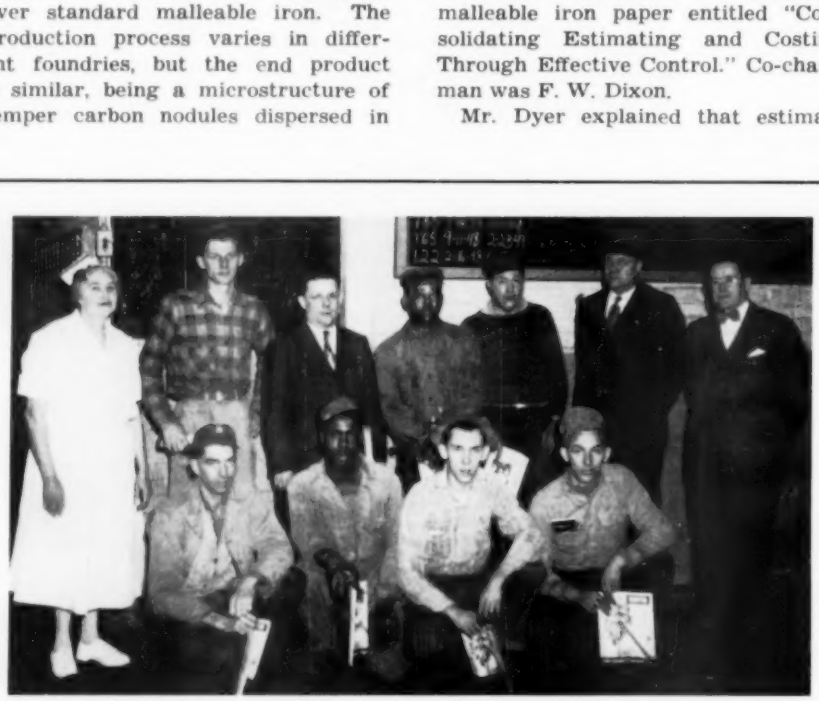
Data obtained through controlled operating conditions serve as a common denominator, which the speaker calls "saleable work." Using that as a base, the pre-costing system takes into consideration all burden items and normal volume of work to establish a conversion rate used for estimating.

At the first nonferrous session, George P. Halliwell, H. Kramer Co., Chicago, spoke on "The Application of Some Fundamental Principles to the Melting, Pouring and Casting of Copper-base Alloys." C. F. Bunting, Pittsburgh Valve & Fitting Division, Pitcairn Corp., Barberton, O., and C. E. Evans, Sandusky Foundry & Machine Co., Sandusky, O., were co-chairmen.

Mr. Halliwell pointed out that to obtain nearly uniform metal structure and strength characteristics, sizes of casting sections should be as nearly uniform as possible. He mentioned the use of fillets to help reduce stress points. In discussing the high and low shrinkage alloys, he stated that the difference in shrinkage is only about 2 per cent, but there is a great difference in the solidification range, due to the lead content. Gases causing porosity, as outlined by Mr. Halliwell, are sulphur dioxide, oxygen, nitrogen and water vapor. He added that oxygen is bad only when it combines with some other material to form an oxide.

L. W. Eastwood, Battelle Memorial Institute, Columbus, O., spoke on "Determination of Melt Quality—Tin

(*Continued on page* 236)



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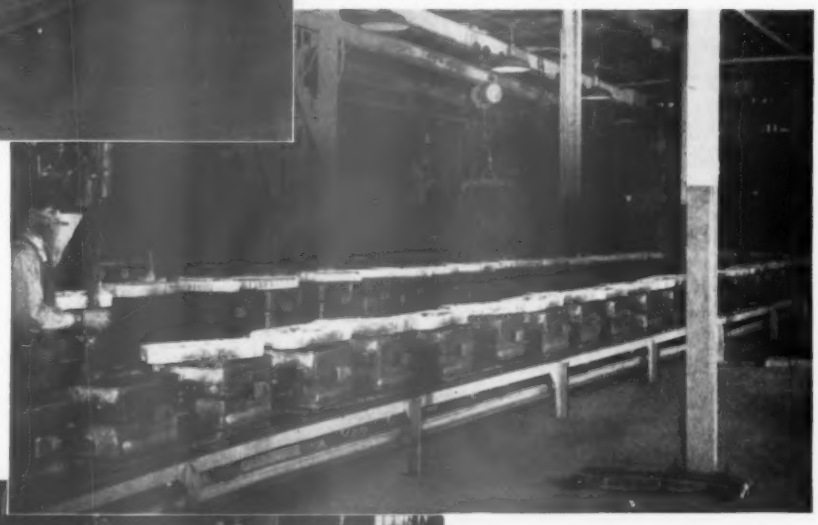

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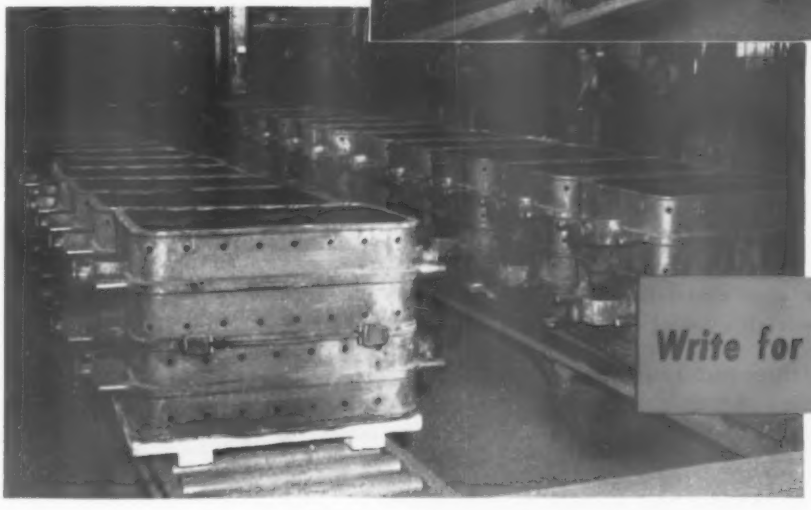

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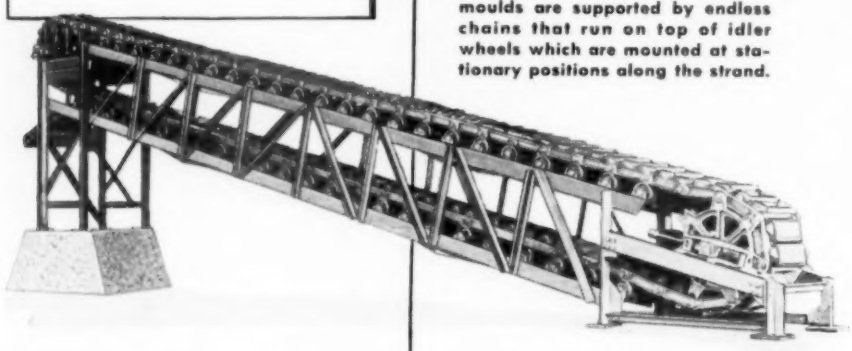

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(*Continued from page* 234)

Bronzes," at the second part of the Friday nonferrous session. Good quality of a bronze alloy, according to Dr. Eastwood, depends upon two factors: The alloys' compliance with specifications and its ability to produce a good casting when poured into a mold. The popularly accepted criteria of melt quality is based on the amount of gas in the melt.

Two types of unsoundness are pinholing and microporosity. They affect tensile strength, density, fracture appearance and leak tightness of cast metal. Dr. Eastwood compared the results of producing good quality melts in different types of furnaces. In general, he said, it is better to melt under oxidizing conditions in the furnace. Also, melting with a glass cover on the metal is a bad practice; it produced the worst quality melt under test conditions.

Other tests conducted by the speaker have shown that calcined clay molds produce the best castings. These molds permit a large range of pouring temperatures, and melts of poor quality have no effect on the density and strength of the castings.

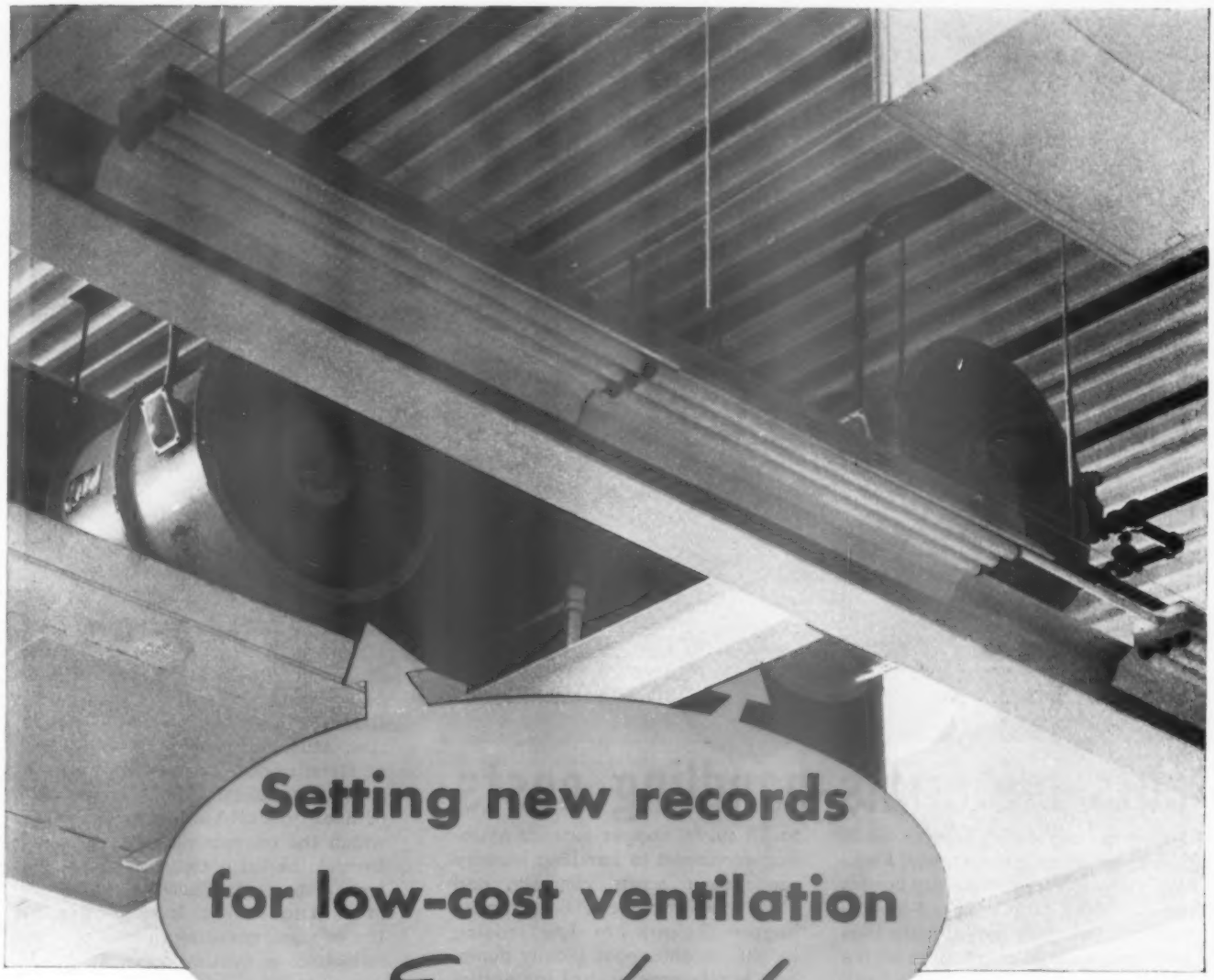
Co-chairmen at the second nonferrous session were W. E. Sicha, Aluminum Co. of America, Cleveland, and Walter Klayer. R. R. Senz, Aluminum Co. of America, presented the first paper, "Quality Control of Aluminum Alloy Castings."

Design Is Important

The speaker stated that, to be assured of quality production, the foundry first must be sure that its castings are designed to permit the level of quality required. Second, foundry practices capable of producing that quality must be developed. Third, inspection methods and tools to help establish these practices and advise the foundry when it runs into trouble, are necessary. Finally, the use of statistical methods for analyzing the data developed by inspection efforts can inform a foundry what to expect of its product and help maintain maximum quality with minimum expenditure of time, effort and money.

"The Effect of Gating and Risering Design on Magnesium Casting Quality" was discussed by H. E. Elliot, Dow Chemical Co., Bay City, Mich., at the concluding nonferrous session. To produce magnesium castings of the highest quality, according to Mr. Elliot, the gating must be designed to accomplish two primary aims: Preserve cleanliness of the metal in its transfer from crucible to casting cavity, and promote thermal conditions to give directional solidification.

(*Continued on page* 238)



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(*Continued from page* 236)

To attain the first aim, the gating system should prevent turbulent flow or provide for removal of the oxidation products from the metal before it enters the mold cavity. The speaker described a gating technique which permits a certain amount of turbulence in the early stages of gating but which removes the undesirable products from the metal before it enters the mold cavity. He suggested the application of bottom gating or its equivalent and the use of skim gates.

In his discussion of directional solidification, the speaker described the conflict that arises between avoiding turbulence and securing optimum thermal conditions in deep vertical-walled castings. Practical techniques by which this conflict may be resolved were offered.

Use Supplementary Oxygen

Opening steel session, with Chester Williams, Massillon Steel Casting Co., Massillon, O., and Howard Cross, Cincinnati Steel Castings Co., Cincinnati, presiding, had for its speaker L. L. Whitney, American Steel Foundries, Alliance, O., who discussed "Use of Metallurgical Oxygen at American Steel Foundries". He described use of dual type oil burners in melting in which the oxygen outlet extends 3 ft beyond the oil outlet to provide better combustion. Burner uses 29 gal of oil and 450 cu ft of oxygen per ton of steel, resulting in a 13 per cent reduction in melting time.

He mentioned that in using the lance immersed in the bath, compressed air or oxygen reduced carbon at about the same rate down to 0.25 per cent; beyond that oxygen operated more rapidly. In one case a carbon content of 1.08 per cent was reduced to 0.45 per cent in 13 minutes with oxygen, using 435 cu ft per ton, while in another a carbon content of 0.70 per cent was cut to 0.40 per cent in 6 minutes using 456 cu ft per ton.

At the second session Sam F. Carter, American Cast Iron Pipe Co., Birmingham, described the effect of melting practice on hydrogen pickup in steel. According to the speaker, total final hydrogen seems to be the net result of the hydrogen in the metal charge, plus or minus the hydrogen absorbed or lost in melting, minus the hydrogen eliminated by the boil, plus hydrogen absorbed in furnace finishing, plus hydrogen absorbed in tapping into the ladle.

Those phases are not equally important in all practices and all types of steel. In some cases hydrogen in the melt may be very high from the first two, and can be reduced only

(*Concluded on page* 240)

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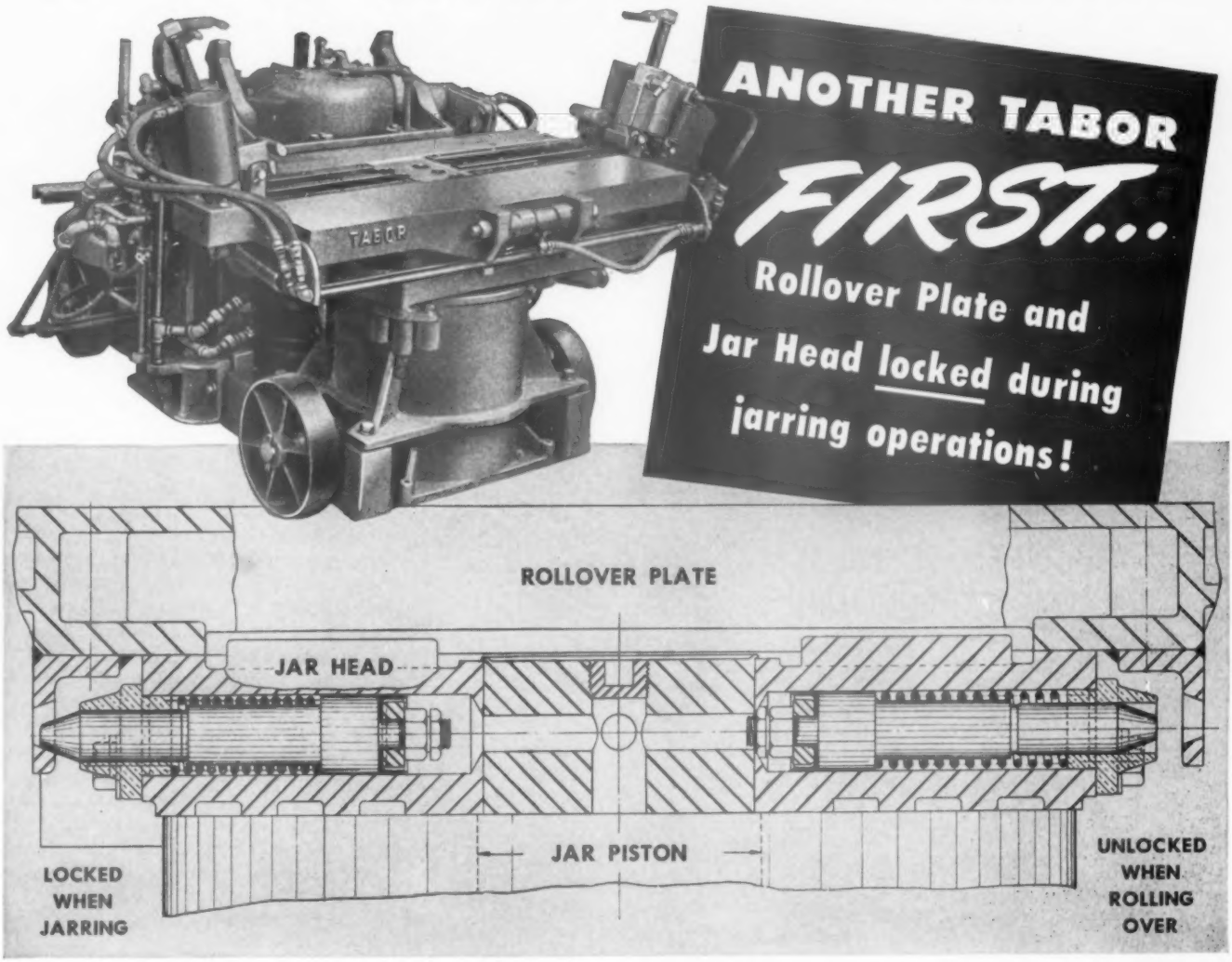

ROLLOVER PLATE—JAR HEAD LOCKING DESIGN

The above sectional drawing illustrates Tabor's new locking arrangement. Jarring air pressure automatically throws rugged pins into seats under the rollover plate. Pins retract under spring tension when jarring valve is closed.

HERE'S a feature never before offered in jar, power rollover, power draw machines. New Tabor construction locks rollover plate and jarring mechanism *into one rigid assembly* the moment jarring air is introduced.

This gives you *four* distinct advantages:

(1) Effectiveness of jarring blow is increased 25%.

(2) Ramming effect is equalized *all over the mold.*

(3) Does away with unwanted "secondary jolt" between plate and jar head—adds greatly to life of both members.

(4) Eliminates all plate wobble, even when handling a mold with uneven weight distribution.

Always big producers, Tabor Rollovers also feature the new quick-change-over table which permits *independent* setting of all four clamps—a table design which is invaluable in either core room or jobbing shop where pattern changes are frequent.

Get full details. Write, wire, or phone today.

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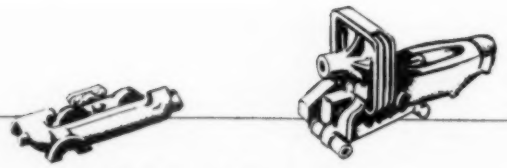
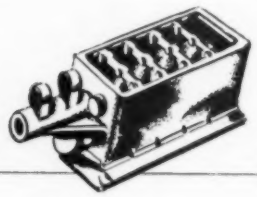
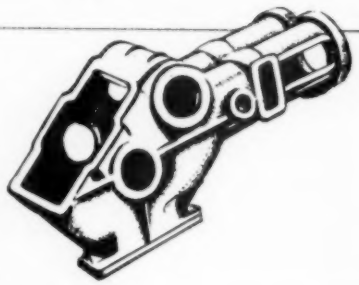


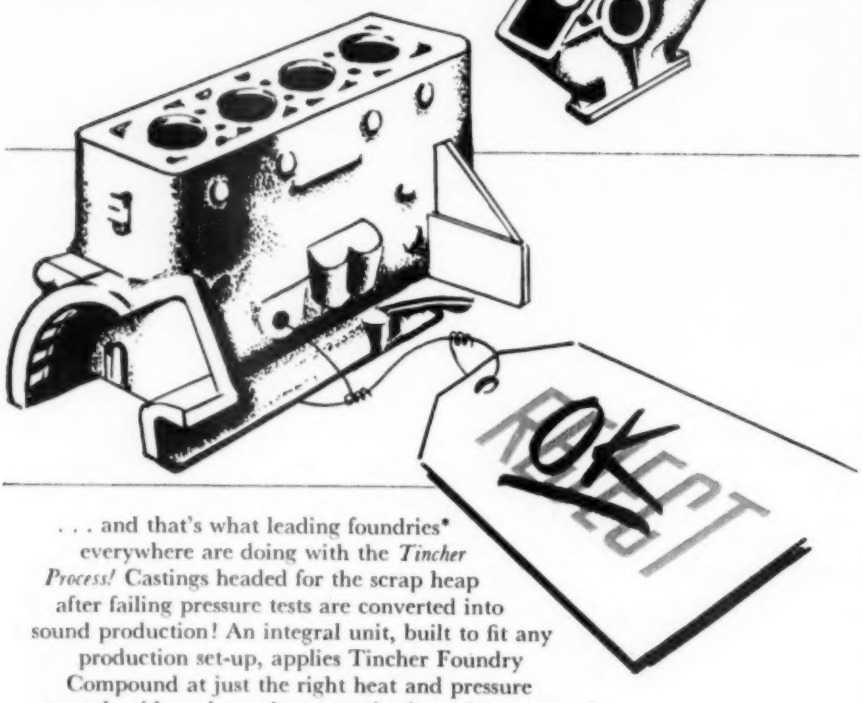
ALL OF
YOUR CASTINGS



Cost Less

WHEN YOU CHANGE "REJECTS"
INTO "OKAY FOR PRODUCTION!"





. . . and that's what leading foundries* everywhere are doing with the *Tincher Process!* Castings headed for the scrap heap after failing pressure tests are converted into sound production! An integral unit, built to fit any production set-up, applies Tincher Foundry Compound at just the right heat and pressure to seal voids and openings completely and permanently.

After machining, the Tincher Process is even more valuable! Costly finished parts like pump housings, engine blocks and automatic transmission housings are saved from rejection due to small casting imperfections uncovered in machining.

Save castings—and save money—with the *Tincher Process!*

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* Names available on request. The Tincher Process is field tested and proved. Stop at Booth No. 1223 at the AFA Foundry Congress and Show in Cleveland, May 8-12, and see the Tincher Process in operation.

(Concluded from page 238)

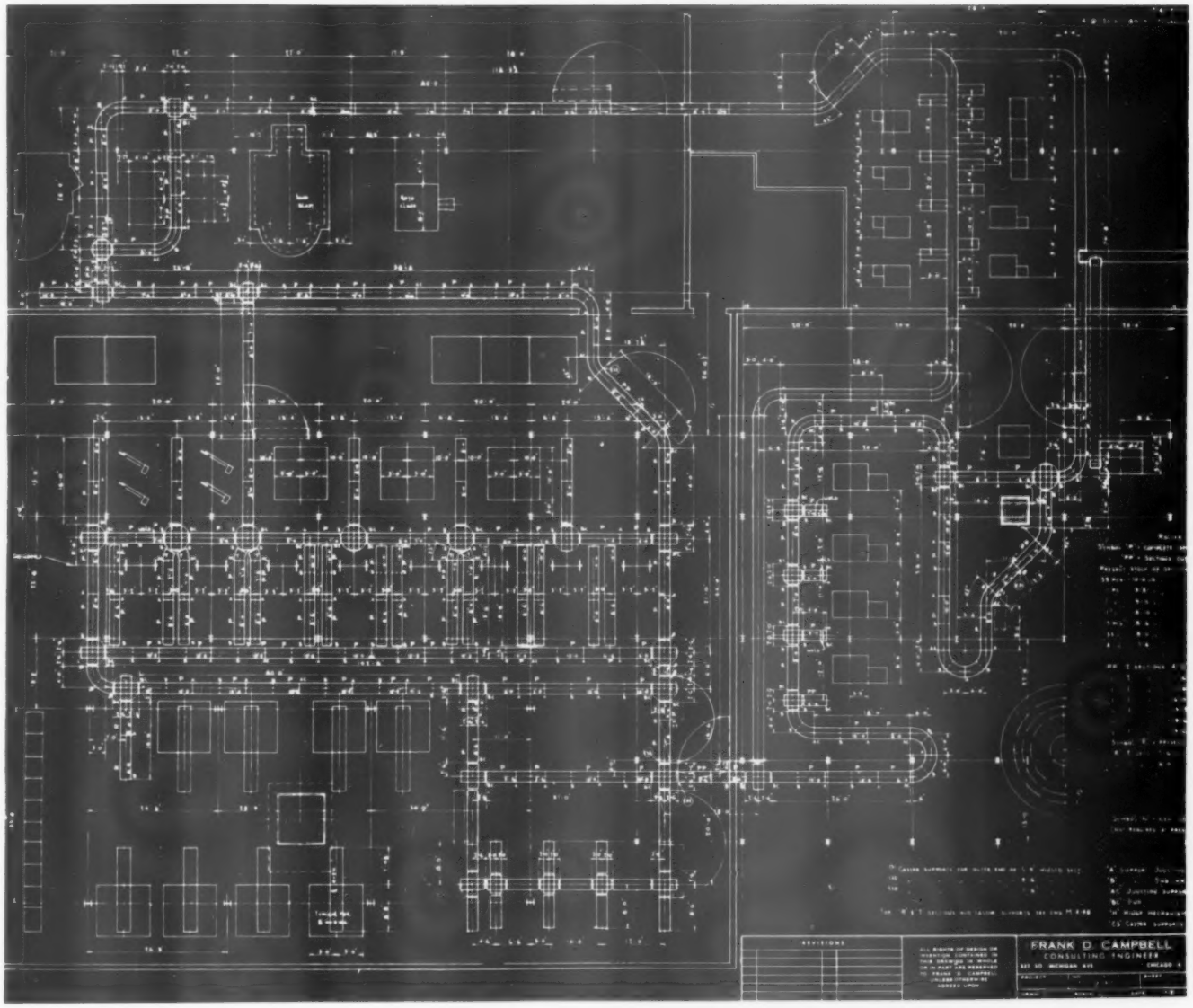
by hard boiling; in others the hydrogen might be low as melted, and the prevention of absorption in furnace finishing and tapping would be more important than boiling. Due to maximum affinity for hydrogen in the ready-to-tap condition, more heats are ruined from improperly dried ladles, spouts, etc., than from conditions within the furnace. Chairmen at the session were Harold Templeton, Babcock & Wilcox Co., Barberton, O., and O. Brown, Dayton Steel Castings Co., Dayton, O.

Third steel session had Leo Dirrig, Atlantic Foundry Co., Akron, O., and William Love, Lunkenheimer Co., Cincinnati, presiding. Michael Bock II, Exomet Inc., Conneaut, O., spoke on use of exothermic materials as aids to better feeding. In the past most feeding aids were either insulating, carbonaceous or mildly exothermic, but development of highly exothermic materials producing temperatures over 4000° F in risers gave added impetus to the procedure. With such materials the riser volumes can be decreased, providing higher yields. Height of the risers can be made one-third to one-half the diameter, and a waiting period before adding the exothermic material is necessary to achieve maximum results. Other advantages, according to the speaker, include shallower copes, cleaner castings, reduced straining of molds, lower handling cost of riser return, and reduced cleaning cost.

Require Fundamental Data

Final steel session featured fundamentals of sand control, by Clifford E. Wenninger, University of Kentucky, Lexington, Ky. He stated that most present-day sand control is empirical—it is only necessary to know what seems to cause a defect, and to know how to prevent it. Fundamental knowledge requires knowing why the defect occurred. Lack of fundamental knowledge causes considerable confusion and a tendency to run into epidemics of defects which come and go apparently without reason. However, some work is being done to provide fundamental data. Mr. Wenninger stated that John B. Caine's procedure of dipping sand specimens into molten steel is along that line.

Work at the University of Kentucky indicates that base sands vary in their thermal stability ranges, and workability. Hence, it is desirable to determine those characteristics and stay within the limits indicated by the values obtained. Co-chairmen of the final steel session were Alexander Prentice, Stark Foundry Co., Canton, O., and John B. Caine, Cincinnati.



CUTTING CLEANING TIME AND COSTS TO A FRACTION

The plan shown above is typical of methods used to provide fluidity of movement. Here is the minimum of hand operations and physical effort.

The cleaning and finishing departments are most frequently the area of congestion and confusion.

When castings are kept off the floor no stagnant semi-finished inventory is present and the time of transit is greatly reduced between the shakeout and shipping room, the variations in layout being made to suit the product, number of operations, and tonnage requirements.

The illustration is an example of our thoroness in engineering design in every phase and part of the foundry from raw materials received to finished castings shipped.

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Consulting Engineers

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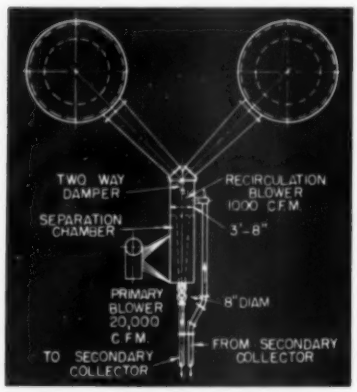
INSTALLS NEW

Cupola Dust Collector

By W. H. HOWELLS
National Malleable & Steel Castings Co.
Cleveland

ACCOMPANYING views illustrate a twin-cupola dust collector recently installed at the Cleveland plant of National Malleable & Steel Castings Co. The collector accommodates the exhaust from two 10 ft. diameter cupolas which alternate daily in their operation. The cupolas are 75 ft tall and 33 ft apart and project 3 ft through a 50 x 57 ft roof. Most of the collection equipment, which amounts to 15 tons, is mounted on this roof. The system provides for the collected material to be piped to a 3600 cu ft storage hopper bin straddling a railroad siding.



Surrounding the top of each cupola and resting on the roof are 15-ft-diameter enclosures 8 ft high. Four triangular-shaped hinged covers form the roof of the enclosures and are counterbalanced so that they can relieve the pressure of any explosion which may occur in the upper portion of the cupola. These covers will also be automatically operated by hydraulic cylinders through a thermocouple so that the system will be protected from excessively high temperatures.

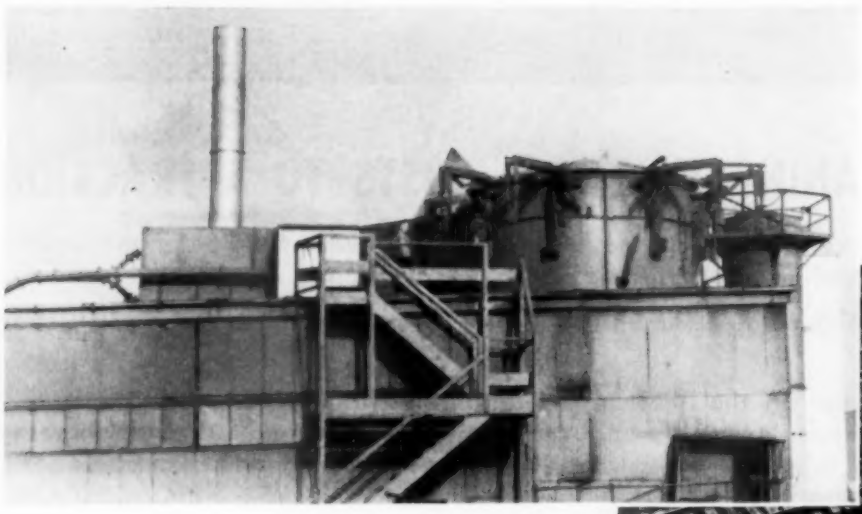
A rectangular-shaped duct leads from each enclosure and these join each other at the primary separation chamber. A two-way damper at this point controls the flow from either cupola into the primary separation chamber.

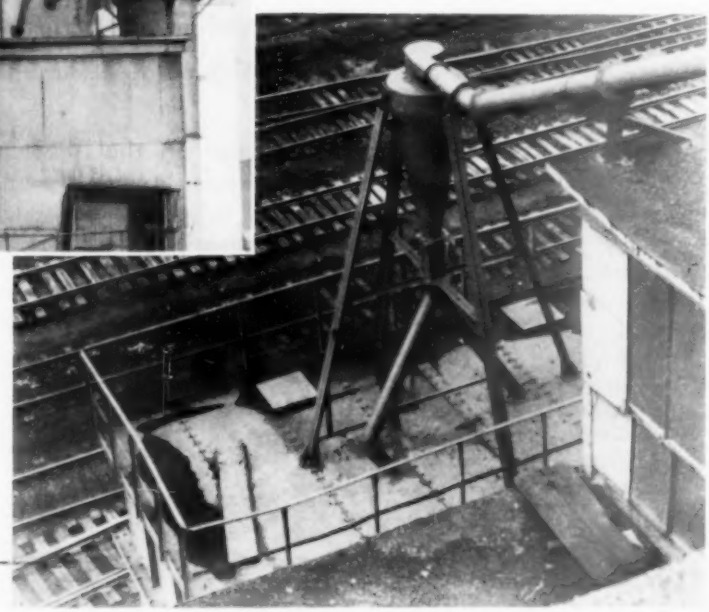
The hot gases enter the primary separation chamber at approximately 240° F. The temperature at the charging door is around 500° F, but cold air induced through the charging door, and the surrounding duct work, cool the gases by the time they reach the separation stage. These temperatures pertain to normal operation. When the cupola bottom is dropped or when the level of charge in the cupola is low, the resulting temperatures are highly elevated and the covers above the cupola must be opened either manually or by thermostatic control.

The primary separation chamber houses two conical-shaped pipes about 10 ft long with diameters tapering from 24 in. to 5 in. These cones have numerous louvres in them so that the openings or slits are opposite to the direction of flow of the gases. A 20,000-cfm fan exhausts the gases from this chamber through the openings in the cones and expels them into the atmosphere through a 25-ft stack. The particles or the matter to be collected resists the change of direction which the gases take and continue to flow through the small end of the cone at a highly accelerated velocity.

The particles then enter an 8-in. diameter pipe 60 ft long and are carried at high velocity to the secondary collector mounted above the storage bin. The secondary collector, a simple cyclone, settles out most of the particles and exhausts into another 8-in.-diameter pipe, which returns them to the primary collector, thereby recirculating the finer parti-

(*Concluded on page 244*)





Top—Sketch showing how the two cupolas are connected to the collector for dust separation

Center—Primary separation chamber, shown at left of cupolas, exhausts gases through vertical stack. Dust particles flow through pipe at left to secondary collector mounted on top of storage hopper straddling railroad siding, as shown in lower illustration

3500 lbs.

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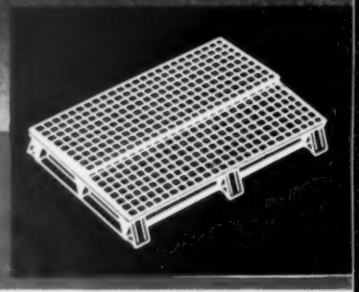
USP PALLETAINERS

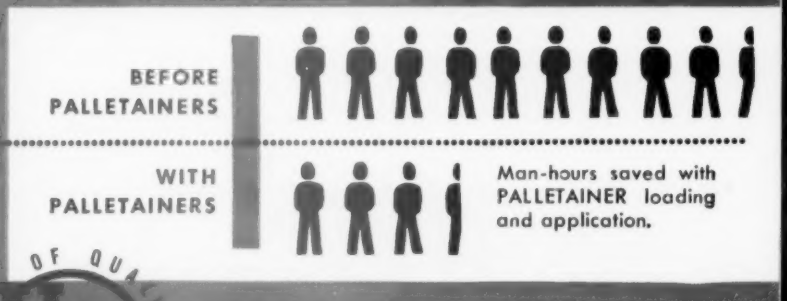


PALLETAINERS fold down flat for space saving return shipment or storage.

USP PALLETAINERS excel any other type of container for practical foundry application in handling and shipping castings and forgings.

Resilient, heavy gauge reinforced welded-wire construction gives maximum strength without excess weight. Contents are visible . . . open mesh makes them self cleaning. They handle and stack easily, inventory is quick, piece by piece handling is eliminated.

USP PALLETAINERS last indefinitely with reasonable care, round trips are numbered in the hundreds. They are the *new standard* for increasing foundry efficiency and deliver *actual, provable savings*. They pay out in a few months' time. Ask for complete information.



Man-hours saved with PALLETAINER loading and application.

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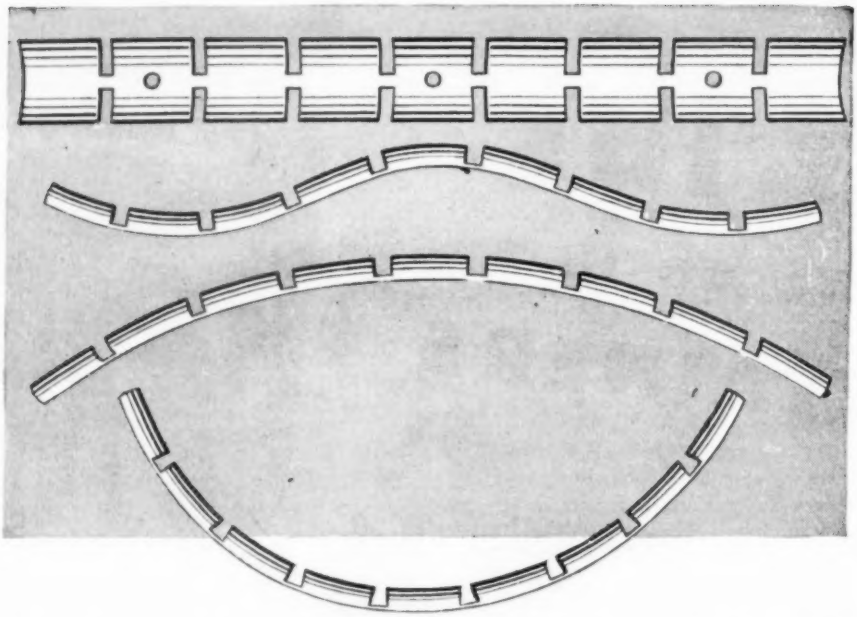
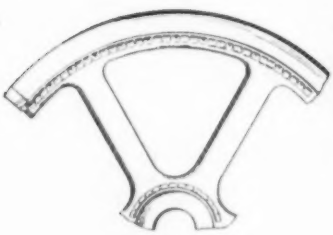
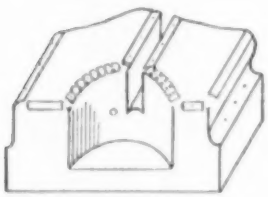


Take the CURVES in HIGH with MILWAUKEE (PATENTED) Adjustable Radius Chills



Adjustable Radius Chills used to chill rim-and-web and hub-and-web fillets in a gear casting.



Adjustable Radius Chills in a semi-circular fillet, in 2 sections.

Curved or irregularly shaped fillets hold no fears for foundrymen who have learned how to use these easily adjustable, extremely flexible radius chills to gain one or more of these advantages:

- Quick, easy, hand shaping to fit single or compound curves along the fillets of cores or molds for cylindrical, round or irregularly shaped castings.
- Effective chilling of hub-and-web and rim-and-web fillets of gears and gear blanks.
- Eliminate buckling . . . because the rows of evenly spaced slots provide "room for expansion" when the hot metal contacts the chill.
- Adjustable Radius Chills are easily broken at 1" intervals to accommodate curved or irregular fillets of any length.
- They effect substantial savings in welding and cleaning costs.

Send for Samples and see for yourself that MILWAUKEE Adjustable Radius Chills can bring you these benefits. and more.

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A 5355-2/5

(*Concluded from page 242*)

cles through the system. A 1000-cfm blower is used for this recirculation from the cyclone.

Collection figures for the three-day period from Nov. 14 to 16 show that 4000 lb of material was collected during 26 hours in which the unit was operating, or 154 lb per hour. During the same period 769 tons of metal was melted, making 5.2 lb of collection per ton of melt.

Sieve tests on the material collected are:

On 100 mesh screen — 43%
On 200 mesh screen — 28%
On 270 mesh screen — 9%
Through 270 mesh screen — 20%

Analysis of the material showed: Carbon by combustion 6.8 per cent; loss on ignition 15.0 per cent; sand (SiO_2) 59 per cent; iron as F_2O_3 18 per cent.

The collector unit was furnished by Aerodyne Development Corp., Cleveland.

Sales Promotional Brochure

Gray Iron Founders' Society, 210 National City-East 6th Bldg., Cleveland 14, has issued a sales promotional brochure containing a collection of sales and advertising material intended as a reference file of suggestions for use by member companies. The brochure, which contains all literature issued by the society on the subject during the past two years, includes reprints of advertisements, articles on gray iron castings, terms and conditions of sale, booklets, etc.

Book Review

Solidification of Castings, by R. W. Ruddle, cloth, 116 pages, 5½ x 8½ in., published by the Institute of Metals, London. Price $2.

The author is head of the melting and casting section, British Non-Ferrous Metals Research Association, London. Part I of the study deals with the more empirical approach to the problem, namely studies on methods of gating and feeding where little or no attempt has been made to measure or analyze the actual progress of freezing in the casting.

Part II reviews the more fundamental work where the rates of heat abstraction and solidification have been measured or calculated. The work described in the second section and the conclusions drawn are summarized briefly in Part III. The review also provides an appendix containing data on the thermal properties of metals, alloys and mold materials.

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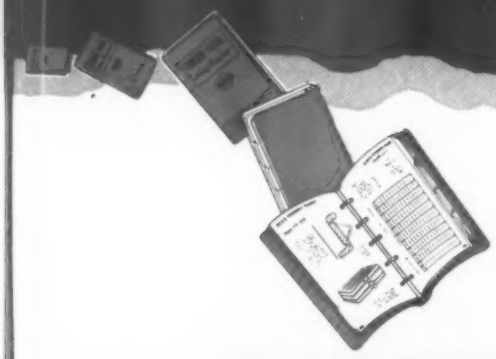

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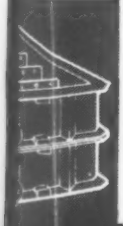

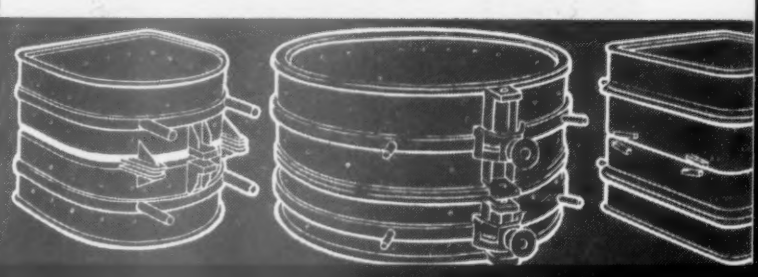

By ROBERT H. HERRMANN
Associate Editor
THE FOUNDRY

Casting Diesel Engine Bearings

OCCUPYING a small section in the huge Cleveland plant of Cleveland Graphite Bronze Co., the company's "heavywall" bearing foundry turns out an average of 4000 bearings daily in three 8-hour shifts with 15 men on a shift. Production in this section is devoted to the larger size bearings, and is described in this article. "Thinwall" bearings, such as the automotive and other types, are produced in another department.

A major percentage of the larger size bearings cast are for use in diesel engines and consist of steel shells with copper-lead linings. Two types of lining material are used, composed of approximately 75 per cent copper, 25 per cent lead, and 85 per cent copper, 15 per cent lead, although each also contains small amounts of silver and tin.

At the start of the bearing production cycle, a steel end-plate is welded to each of the tubular steel shells which are to form the outside of the bearings. This plate serves as the base of the mold. A graphite core is centered in the container thus made and a graphite pouring plate is cemented to the top of the cylinder. A number of these molds are shown in the left foreground of Fig. 1.

Molds then are placed on a moving belt which carries them through an electric oven where they are baked to dry and cement bonding the pouring plate to the shell. They are then placed in another electric oven and heated to 1960° F in a reducing atmosphere just prior to being poured.

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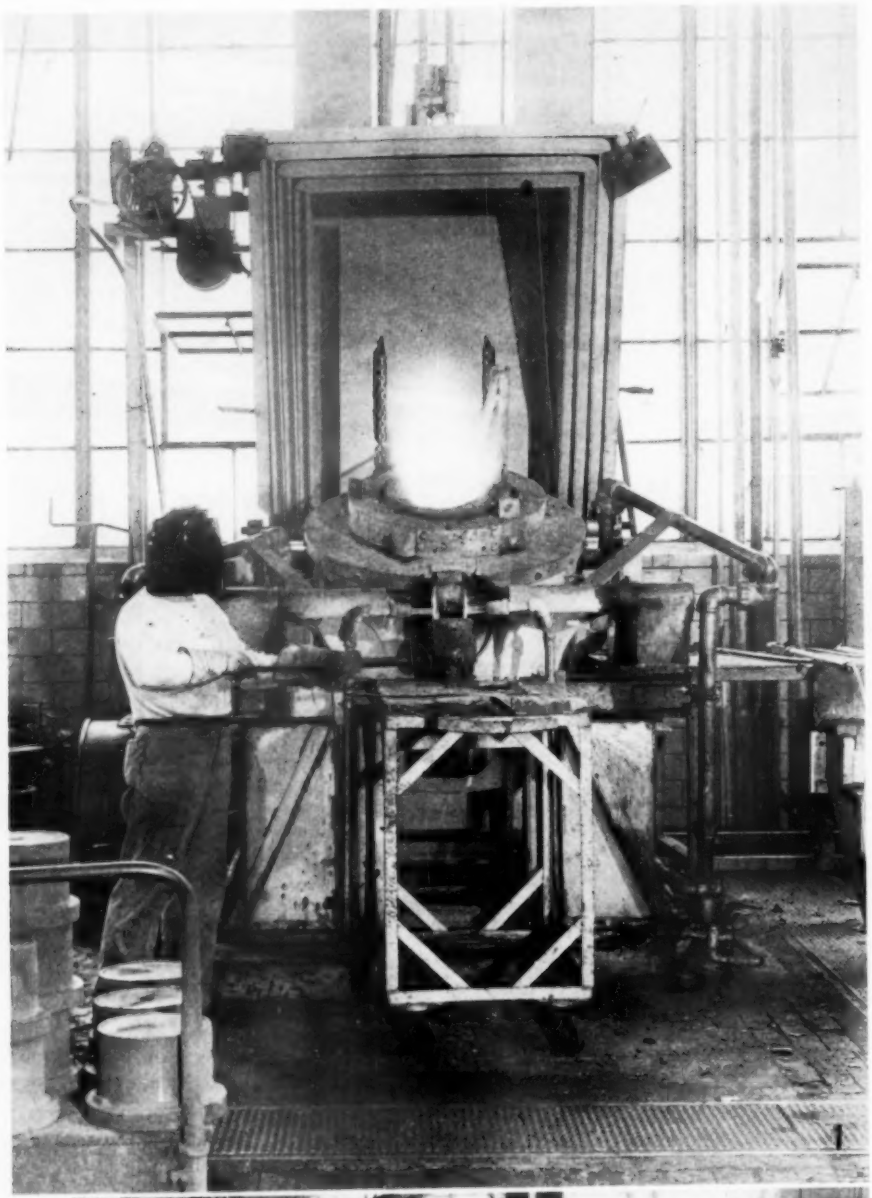

Fig. 1—Bearing metal is melted in a 600-lb gas-fired crucible furnace

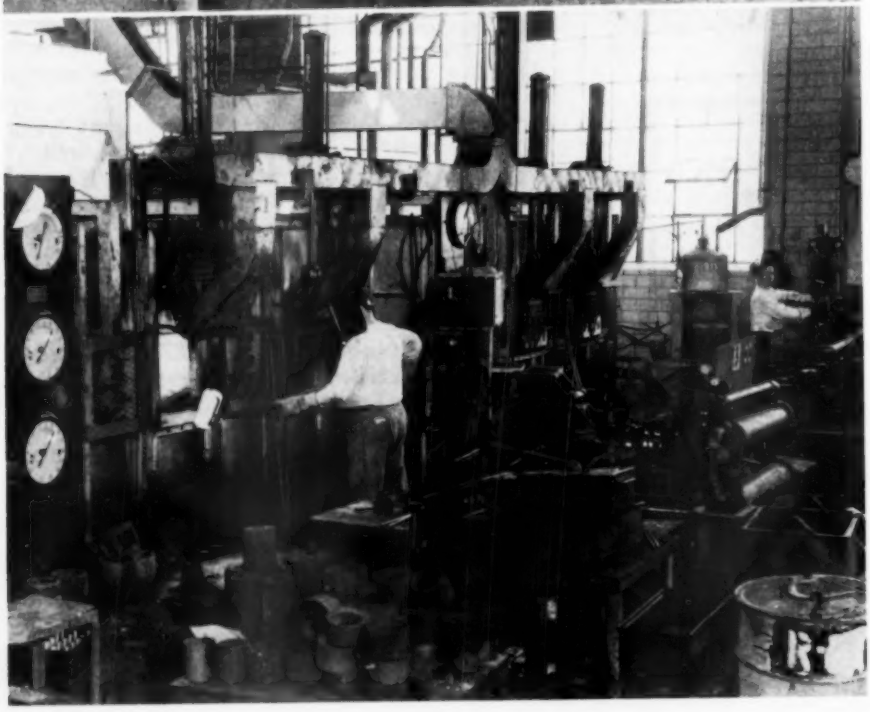

Fig. 2—Battery of electric ovens used to heat molds prior to pouring

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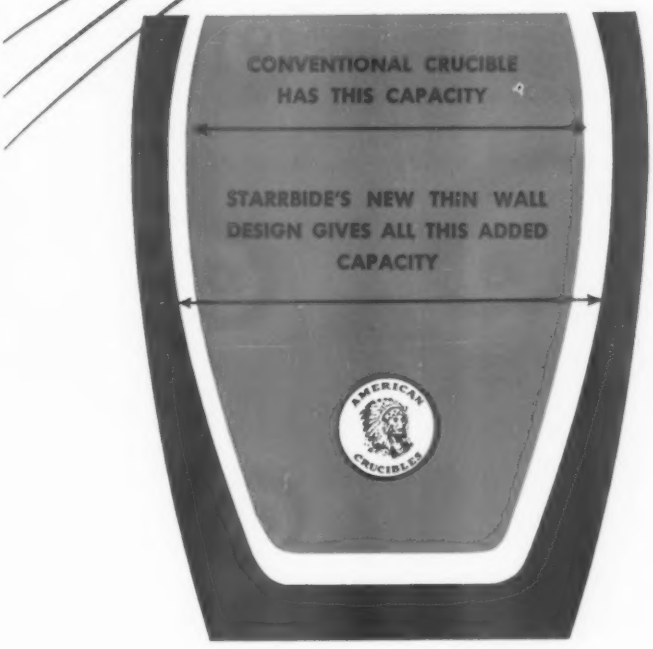
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60	209.	28.	241	32.1
70	239.	32.	268	36.3
80	269.	36.	298	40.1
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100	328.	44.	361	49.
125	373.	50.	405	53.6
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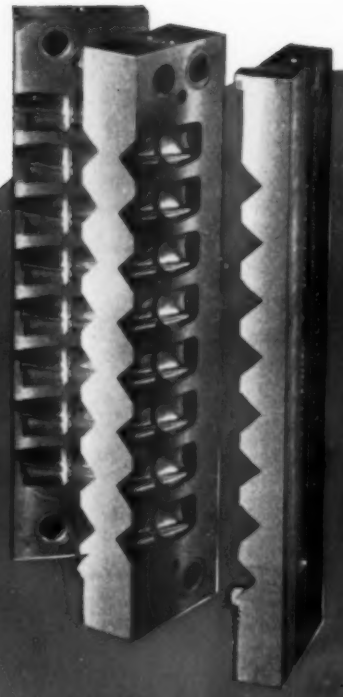

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● Made of aluminum alloy of amazing wear resistance, *Duplicast* is the complete answer to the vexing problem of keeping blower core boxes in repair. The expendable feature of *Duplicast* eliminates repairing and production interruptions—because *it's actually cheaper to use new, dimensionally accurate Duplicast boxes than to spend time and money to repair them.*

800,000 Perfect Cores at 50% SAVINGS in Core Box Cost

● The 3-part core box with 16 cavities shown above was blown 50,000 times, producing 800,000 perfect cores without patching or repairing of the core box in any way—after wear began to occur it was literally thrown away and replaced by a new box costing less than repairs. A 50% saving in expense alone was realized PLUS all other significant advantages of the *Duplicast* box. (This user buys 3 core boxes at one time).

Four core boxes and 500 dryers furnished to an automotive foundry. Dryers as well as core boxes produced by the exclusive *Duplicast* method. *This new development now makes it possible to buy "blow-in" dryers of extreme accuracy at the same low cost of "place-on" dryers.*

● Write for our new, detailel BULLETIN "D"

INDUSTRIAL PATTERN WORKS

2625 W. Belmont Ave.
Chicago 18, Illinois

BOOTH 1626 ***We invite you to visit us at the Foundry Show in Cleveland — to see and hear how this process is saving money and increasing production for numerous foundries.***

(*Concluded from page* 246)

Lining metal for the bearings is melted in a 600-lb gas-fired crucible furnace and brought to a temperature of 1900° F. Metal is hand-ladled from that furnace, as shown in Fig. 1, into 60-lb induction holding furnaces where it is brought to between 2000 and 2100° F and held there.

Metal is released from the holding furnaces through a valve in the bottom into hand ladles in preparation for pouring the shells as they are removed from the oven one at a time. Immediately after pouring, the shells are quenched in water at a temperature of 70 to 90° F. The quench water contains a soluble soap which emulsifies in water and increases its wettability. It also serves to reduce the possibility of steam pockets which otherwise might be developed by putting the hot shell into plain water. The quench tanks are equipped with a movable table upon which each shell is placed and lowered gradually into the water.

Describes Procedure

The operation for making the smaller size heavy bearings differs somewhat from that described for the larger sizes. The procedure consists of placing the lining metal into a chrome-iron container such as those shown in the foreground of Fig. 2. The shell containing the graphite core is placed on top of the container; the two pieces then are grasped with a special clamping tongs and placed in the electric oven. The metal charge melts in the oven. When the mold is removed (Fig. 2), it is inverted, and the shell is poured automatically. The container is removed, the lining metal charge added in preparation for another shell, while the poured shell is placed in a quenching tank.

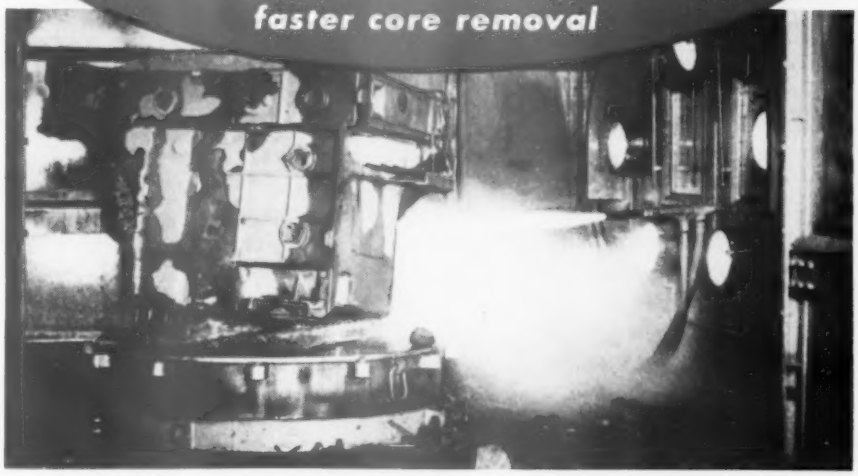
The shells are taken from the quenching tanks, the steel end plates machined off and the graphite pouring plates removed. Then the graphite core is removed and the bearing sent to the finishing department where machining operations convert it to its usable form.

Graphite cores used in the shells are made of powdered graphite and bentonite clay, compressed and baked in an electric oven. Through application of a new method of removing the cores, developed as the result of a suggestion by Charles Zamiska, senior furnace operator, the cores may be reused. The financial saving made possible through salvage of the core is considerable and will result in a substantial payment to Mr. Zamiska under the rules set forth in the company's employee suggestion plan.

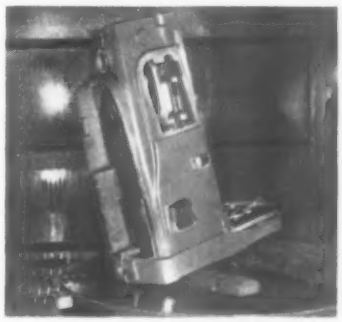
Pangborn

HYDRO-SAND BLAST

gives your foundry quicker cleaning, faster core removal



HYDRO-SAND BLAST *keeps operator away from dust and dirt, helps him do a better job faster!*



ONE MAN *removed cores, and blast cleaned this casting in just 15 minutes with Hydro-Sand Blast!*

For fast, safe, economical blast cleaning and core knockout—cost-conscious engineers pick Pangborn Hydro-Sand Blast!

Hydro-Sand Blast does a thorough job, removes core sand and rods without trouble, ends the possibility of sledge damage in your plant. Here's how it operates: work rotates on an electrically controlled table inside a self contained steel room which controls dust and dirt at all times!

High velocity sand and water clean castings completely, which means roughing, chipping and finishing operations are both faster and cheaper. Labor costs are further reduced as only one man is needed to operate a Hydro-Sand Blast unit.

Get the Facts! Find out for yourself how Pangborn Hydro-Sand Blast improves working conditions, does a better job, saves money. Bulletin 1100 contains full details. Send for it today. Address: PANGBORN CORPORATION, 2300 Pangborn Blvd., Hagerstown, Maryland.

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control Equipment

Pangborn

BLAST CLEANS CHEAPER with the right equipment for every job

Fig. 2—Simultaneous jolt-squeeze rollover draw machine operating with flask approximately 4 ft square

BRITISH APPLICATION OF

SIMULTANEOUS JOLT-SQUEEZE Molding Machines

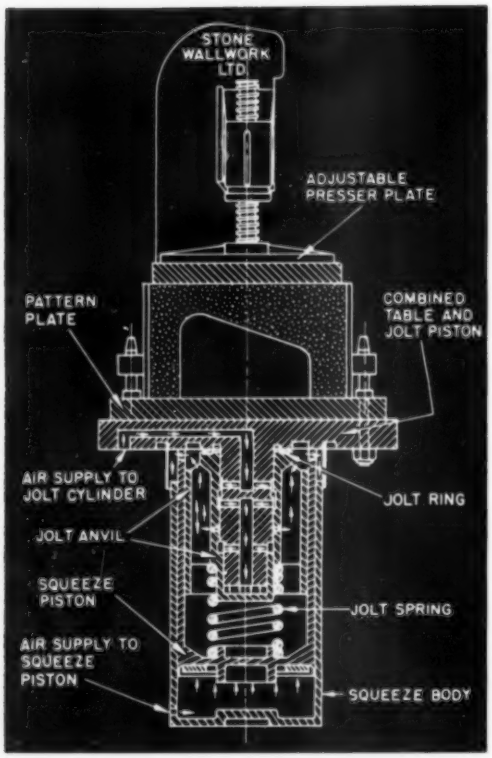


Fig. 1—Ramming unit in simultaneous jolt-squeeze position

By A. G. THOMSON

SIMULTANEOUS jolt-squeeze machines are giving very satisfactory results in leading British foundries. These machines are designed on the principle of shockless jolting, and in their system of operation are fundamentally different from the usual shock-jolt plain-squeeze machines.

On a shock-jolt machine of the normal type the pattern plate is fixed to the machine table. The flask is located on the pattern plate and filled with sand. Jolting is then carried out by admitting compressed air underneath the jolt piston, usually at a pressure of from 80 to 100 psi.

The force exerted is such that the piston, machine table, pattern plate, flask and sand are lifted to a predetermined height. The supply of compressed air is then cut off and the air underneath the jolt piston exhausted. Immediately the air pressure is relieved the table with its load drops under its own weight until the underside comes into contact with a striking pad which is usually fixed to the cylinder of the machine.

As soon as the piston falls to the bottom of the cylinder the same cycle of operations is repeated, the jolting operation being continued until the sand has been packed down and rammed sufficiently hard to produce a satisfactory mold. The degree of mold hardness required is, of course, governed by the type of sand used and the type of metal (ferrous or nonferrous) in which the casting is to be produced.

Speed and density of ramming are obviously dependent on the number of jolts or impacts made. It is also evident that the greater the number of impacts in a given time, the shorter becomes the individual ramming time for each mold and the greater the number of molds produced per hour.

An important point is that the

(*Continued on page* 253)

to help you pick the right abrasive for low-cost cleaning

PANGBORN OFFERS YOU THIS *new, free* ABRASIVE ANALYSIS SERVICE . . . .

Now you can find out which type of abrasive is best for your blast cleaning operation with Pangborn's new Abrasive Analysis Service!

To keep costs low, abrasives must be matched to the finish you want with the equipment you use. Contrary to popular belief, no one abrasive is ideal for all kinds of work. And that's where Pangborn Service Engineers can save you money.

Backed by 46 years' experience with blast cleaning problems and as pioneers with metallic shot and grit, Pangborn Service Engineers know which type of abrasive is best for a specific job. They can show you *why* you should use heat treated, annealed, "Malleabrasive", or "Certified" hard metallic shot or grit.

There is no obligation for this service. All you need do is tell us what kind of equipment you use and what you clean. Then Pangborn Service Engineers will recommend a type of abrasive *which experience has proved* to be the most economical for your work.

While at the Foundry Show, ask any Pangborn Service Engineer for a recommendation—or write to PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Maryland.

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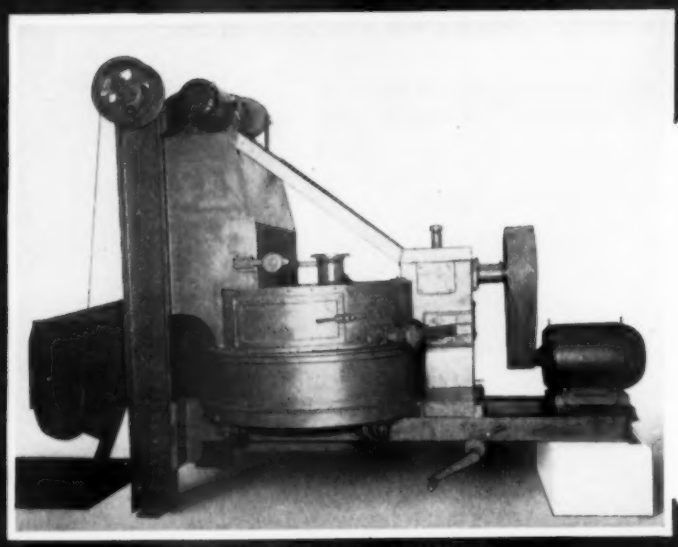
CORE SANDS... FACING SANDS... HEAP SANDS



"Lancaster" Mixer Symbol EAG-4.
For batches from 500 to 900 pounds.

"Lancaster" Mixers fit the modern trend in foundry practice . . . the trend toward replacing "old-school" equipment with machinery that performs its task with *predictable precision* and offers savings in man-hours and material.

For core sand mixing, the efficiency of "Lancaster" Mixers reflects substantial savings in oil and binders, without sacrificing the desired characteristics of the cores. Core strength is uniform and controlled. Grain sizes are dependably distributed and preserved throughout the mixing process.

In the preparation of facings and heap sands, counter-current "mixing-mulling" action . . . pioneered and brought to its peak by the makers of "Lancaster" Mixers . . . provides major advantages:

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(2) Binders of any kind are mixed with maximum efficiency.
(3) Lumps and nodules are avoided — no need for aeration after mixing.
(4) "Lancaster" Mixers are quickly and easily cleaned.
(5) Despite the speed of "Lancaster" mixing, no heat is generated in the mix.
(6) "Lancasters" are "power misers", operating at maximum capacity on minimum power requirements.

Write today for free bulletin devoted especially to "Lancaster" Mixers in *the foundry industry*. No obligation.

Cores shown are products of dependable, scientific "Lancaster" Mixing.

POSEY IRON WORKS, *Inc.*

Brick Machinery Division

LANCASTER, PENNSYLVANIA

Fig. 3 (top panel)—Swing heads in position while jolt and squeeze operation is being performed simultaneously

Fig. 4 (second panel)—Machine is turned over and pattern draw is commencing

Fig. 5 (third panel)—Removing the finished mold from the machine

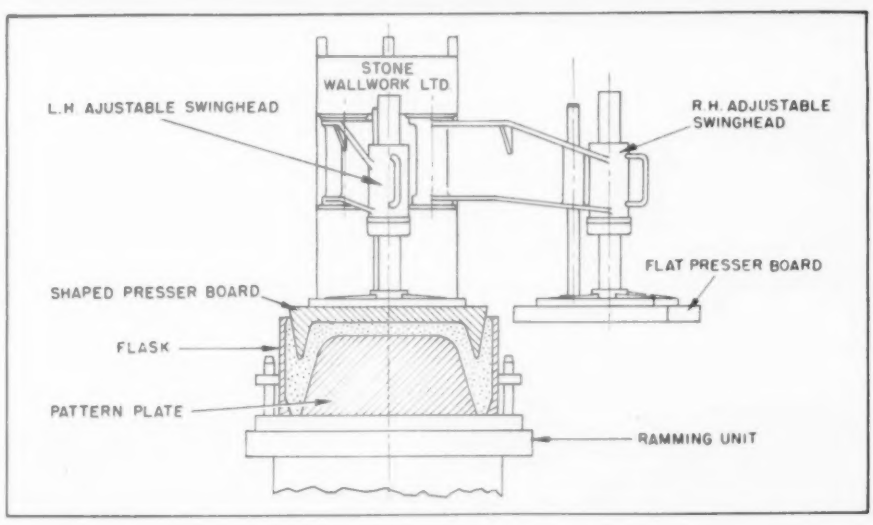


Fig. 6 (bottom panel)—Twin pressure heads, each of which swings over center of machine table

(*Continued from page* 250)

packing of sand in a flask takes place by building up from the face of the pattern plate to the top of the flask, so that if a section of a finished mold is examined it will be found that throughout the depth of the mold a variation in the density of ramming has occurred. This feature which cannot be avoided with a shock-jolt-squeeze machine, has been eliminated by the simultaneous jolt-squeeze molding machine.

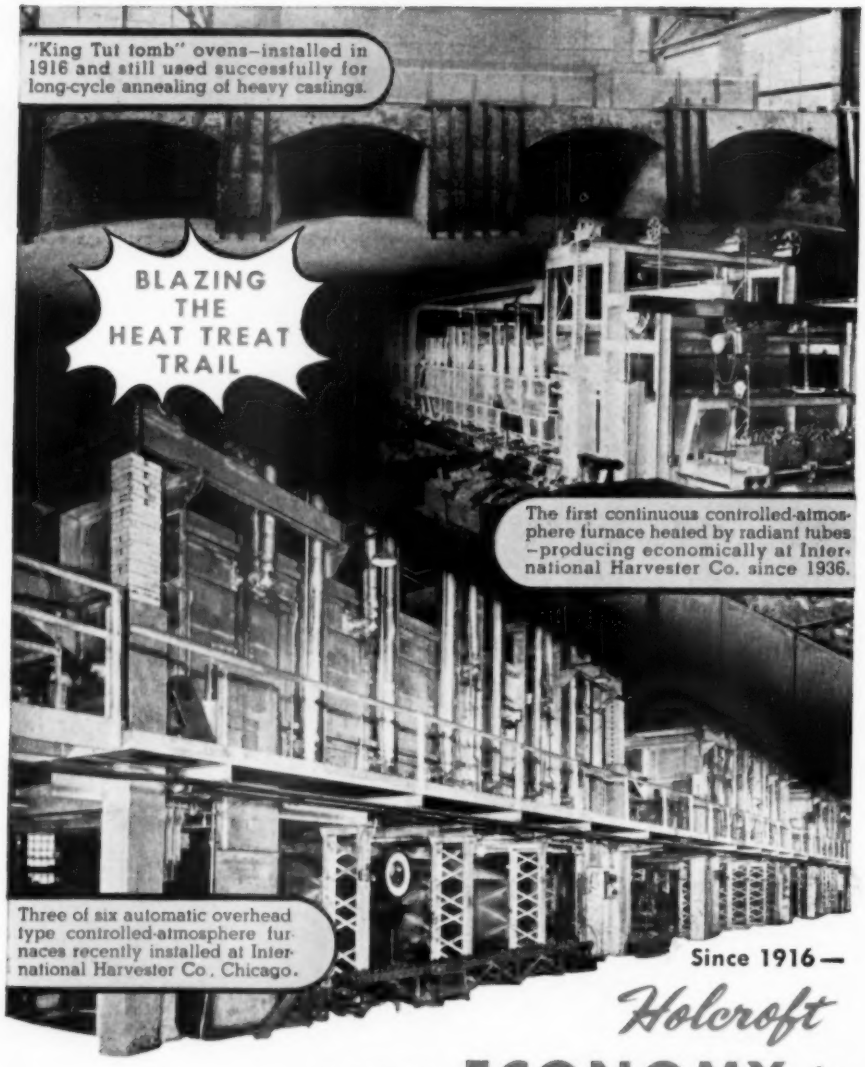
A machine of the latter type, developed by Stone-Wallwork Ltd. of Britain, is shown in Fig. 1. It will be seen that the jolt piston operates in an anvil and an important difference from the shock jolt machine is that this anvil rests upon a heavy coiled spring. This spring in turn rests inside the squeeze cylinder which operates in an external squeeze body.

On the introduction of compressed air to the underside of the jolt piston, the table lifts and at the same time the anvil operating inside the squeeze piston depresses the jolt spring until a balanced loading occurs. At this point the air supply to the jolt cylinder is cut off by a system of porting, and the air inside the cylinder is exhausted.

Immediately the table gravitates towards the anvil, which is now moving upwards under the pressure of the jolt spring, and the contact between the anvil and the striking pad of the table produces the jolting action, which might aptly be described as a "clapping" action. As with a shock-jolt machine the sand is rammed down vertically.

Assuming that an ordinary shock jolting machine has a 2-in. stroke, the jolt piston of a simultaneous jolt-squeeze machine of similar capacity would lift the table 1 in. while the anvil would be depressed 1 in. It is thus possible for many more impacts to be given to the table per second, thereby reducing the operating time appreciably.

The shockless jolter principle has


"King Tut tomb" ovens—installed in 1916 and still used successfully for long-cycle annealing of heavy castings.
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From the tomb-type ovens of 1916 to the latest high-production units, Holcroft furnace engineering has led the way to new economies in malleable annealing. The radiant-tube-heated, controlled-atmosphere furnace—introduced by Holcroft in 1936—replaced heavy work containers with light-weight trays, giving notable savings in time and fuel. The Holcroft overhead furnace design cut time and labor to a new low; and we can cite many other advantages provided by Holcroft trail-blazing.

Holcroft furnace design is based on *complete metallurgical and engineering service*. We design each furnace for its individual application, selecting *without bias* the elements best suited to the job; and in so doing, we constantly develop improved features and processes. As a result, Holcroft furnaces meet every production requirement *at minimum over-all cost*—for malleable annealing and for *every other* heat treating process.

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an important application, namely the continuance of the jolting action during the upward movement of the squeeze piston and also while the mold is actually being squeezed. It is suggested that this is an entirely novel feature of molding machine design.

As stated previously, the jolting unit consists of a piston and anvil and is housed in the squeeze piston. When the squeeze pressure is applied the squeeze piston moves upward until it engages with the underside of the machine table and continues its upward journey, carrying the mold to the underside of the squeeze plate and slightly compressing the jolt spring.

The flask is now clamped between the pressure plate and the jolt table by means of the squeeze piston. Compressed air is once again forced into the jolt cylinder and works expansively, moving the anvil downwards and compressing the jolt spring, while the table remains stationary. The anvil goes on moving downwards until the exhaust position is reached and is then thrown back against the underside of the machine table by the spring recoil.

Apply Jolt and Squeeze

Since the squeeze pressure is still being applied, jolting and squeezing are being applied simultaneously.

Apart from the saving in time this process has the further advantage that the sand is rammed laterally, which is essential when extremely accurate castings are required.

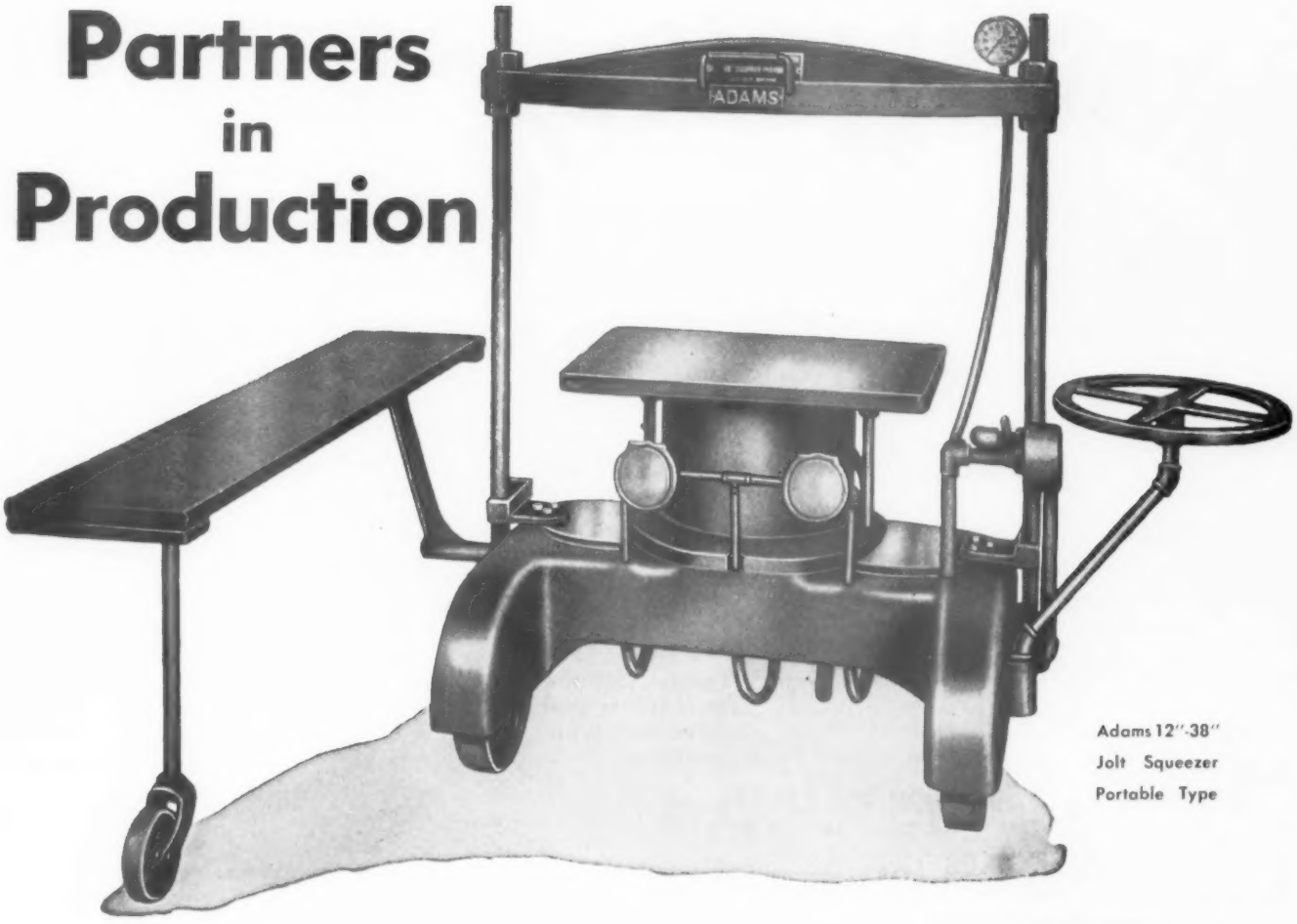
This method of simultaneous jolt squeezing has been developed still further by the introduction of machines with two pressure heads, each of which swings over the center of the machine table, as shown in Fig. 6.

On the left-hand pressure plate is fitted a shaped pressure board which conforms to the shape of the pattern to be molded. The flask is filled with sand and jolt-squeezed in the normal manner with the shaped pressure board in position, after which the squeeze cylinder is exhausted and the left-hand squeeze head is returned to the clear position. Additional sand is then placed in the flask and the right-hand swing head is brought over the machine table. Attached to the right-hand swing head is a normal flat pressure board, whereby the flat ramming is given when the mold is jolt squeezed for the second time.

The double operation is most effective since all the interstices of the pattern are filled with sand. This method undoubtedly produces castings to the finest dimensional limits.

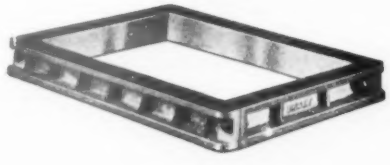
(*Concluded on page* 256)

Partners in Production



Adams 12"-38"
Jolt Squeezer
Portable Type

ADAMS
MOLDING MACHINES and CUSTOM-BUILT FLASK EQUIPMENT



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(*Concluded from page* 254)

These machines can also be fitted with an automatic device which enables the entire cycle of operations —filling the flask with sand, the movement of the swing head over the machine table, jolting, squeezing and pattern drawing—to take place in the minimum time without the constant supervision of an operator, the entire cycle being started simply by pressing a pushbutton switch.

An example of the use of a simultaneous jolt squeeze molding machine is given in Figs. 2, 3, 4 and 5.

Fig. 2 shows a simultaneous jolt-squeeze turnover draw machine operating on a flask approximately 4 ft square. This machine can be used on both shallow and deep work. The operator is filling the flask with sand from an overhead hopper, the correct amount of sand being gaged by the use of a filler frame.

In Fig. 3 the machine is shown with the swing heads in position over the machine table while the simultaneous jolt squeeze operation is being carried out. The squeeze lever is being operated by the left hand and the jolt by the right foot.

In Fig. 4 the machine has turned over and the pattern draw is commencing.

Removal of the finished mold from the machine is shown in Fig. 5. This operation is facilitated by use of concealed rollers attached to the pressure heads and also by a swing-down roller track which connects with a line of gravity roller track leading to the closing position.

It will be noted from the illustrations that the machine is operated entirely by a single man, the ancillary equipment being so designed that all heavy lifting is eliminated and physical actions are limited to operating the various levers.

Maine Apprentice Conference

Announcement has been made of the sixth annual apprenticeship conference sponsored by the Maine State Apprenticeship Council and the Bureau of Apprenticeship, District 1, U. S. Department of Labor, to be held June 8-10, at Poland Spring House, Poland Spring, Me. Reservation requests should be forwarded to Daniel A. Barry Jr., assistant manager of the hotel. On June 7 a special luncheon meeting is planned for Canadian guests who will be hosts in Quebec City in 1951.

motor blocks

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You can remove more metal in less time, for less money, and do a better job, if you have the efficient and economical combination of the right snagging wheels and the *right* machines.

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Why not accept their help? Their cooperation will cost you nothing. It will place you under no obligation. Just tell us with whom in your organization, our Electro Field Engineer may talk; and if you request it when you write, phone or wire, we will gladly send you free a copy of our 64-page High Speed Grinding Manual. Electro Refractories & Alloys Corporation, 344 Delaware Ave., Buffalo 2, N. Y.

Electro HIGH-SPEED GRINDING WHEELS

CASTS SOIL PIPE

(*Continued from page* 131)

Since wall thickness and inside diameter of the pipe depends on the amount of metal poured into the mold, it is important that the weight be measured accurately. This is accomplished at the Chattanooga foundry by an ingenious device, developed by their engineers, which controls the weight of metal within a 5 per cent tolerance.

The reservoirs, on which a gas flame is played to minimize metal oxidation, are filled quickly from the ladle carried on a monorail over the pouring platform shown in Fig 9. This ladle receives metal from a larger ladle moved by monorail from the nearby cupola.

Reservoirs Are Tilted

Once the four reservoirs are filled, the metal skimmed, and the molds revolving at the required speed, the former are tilted and the metal flows through pouring spouts into the four molds simultaneously (Fig. 10). The molds continue to revolve until the metal solidifies — about 30 seconds. Centrifugal action then is stopped and the four flasks are tilted to a vertical position for ejection of the castings. This is accomplished by four pneumatically-operated plungers which descend to force the pipe and sand through the flasks to an underground apron conveyor below the machine.

Each of the machine operations just described follows the preceding one in timed sequence automatically. Once the operator commences the cycle, the controls take over to initiate the subsequent steps.

Because of possible breakage of the red-hot pipe in dropping onto the casting conveyor, the latter is supplied a continuous cushion of sand from the central sand system. Speed of the conveyor is adjusted to production, and when the pipe returns to the ventilated shakeout at floor level (Fig. 6) it is sufficiently cool to handle. Most of the sand returned with the castings drops through bars located just ahead of the shakeout screen and is carried by belt conveyor to the preparation unit for reuse. Pipe proceeds to the vibrating shakeout grid where additional sand is shaken off and the hub cores drop out. The pieces then are picked

(*Concluded on page* 260)

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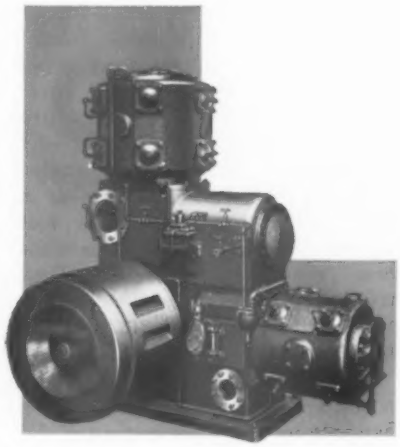
that means lower costs of Installation, Operation and Maintenance



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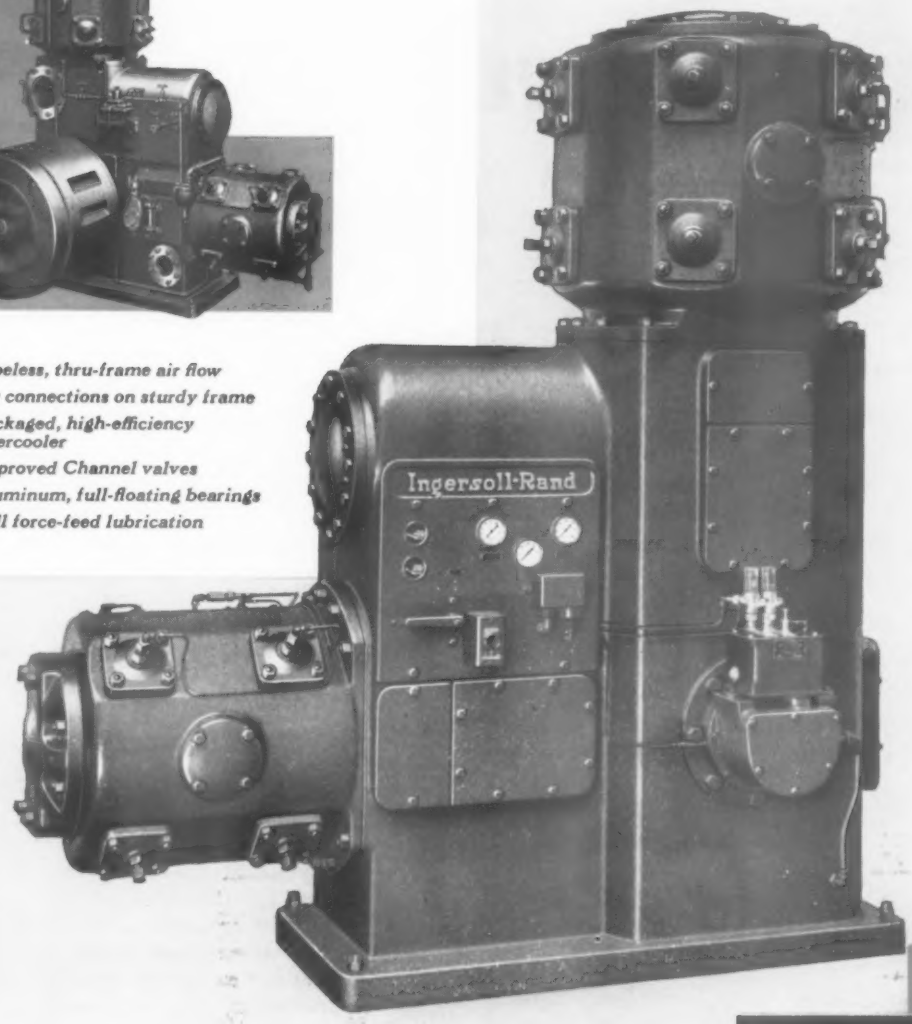

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Experienced Foundrymen say:

"Always specify Certified"

Accepted and used for over 55 years

PITTSBURGH CRUSHED STEEL CO.
PITTSBURGH, PENNA.

STEEL SHOT AND GRIT CO.
BOSTON, MASS.

(*Concluded from page 258*)

off and immediately weighed and calibrated to make sure they meet weight and dimensional tolerances, before being transported to the cleaning room and final inspection.

Since the pipe is cast in sand molds, no subsequent annealing is necessary. The process also provides not only uniform grain structure, but also uniform wall thickness and concentric section, as indicated in Fig. 1. This permits the pipe when being installed to be cut with a pipe cutter much in the same manner as steel pipe.

It is obvious that careful control must be maintained over sand properties. For this purpose a set of instruments to make regular analyses is maintained on the floor near the sand preparation unit. The molding sand mixture has approximately these properties: Green compression strength 16 lb, permeability 96, flowability 70, grain size 57, moisture slightly under 5 per cent.

The sand system contains about 75 tons. Sand returned from the shakeout by conveyor belt (Fig. 7) is raised by bucket elevator to a storage bin. From there it is drawn as required into a 1500-lb capacity mixer. Prepared sand is moved by overhead belt conveyor back to the 10-ton capacity hopper above the molding and casting machine.

Installation and final development of the complete unit were under the direction of John A. Lasater, chief engineer of the foundry department, and Sam C. Northington, foundry superintendent, Combustion Engineering-Superheater Inc., Chattanooga.

Holds Refractories Conference

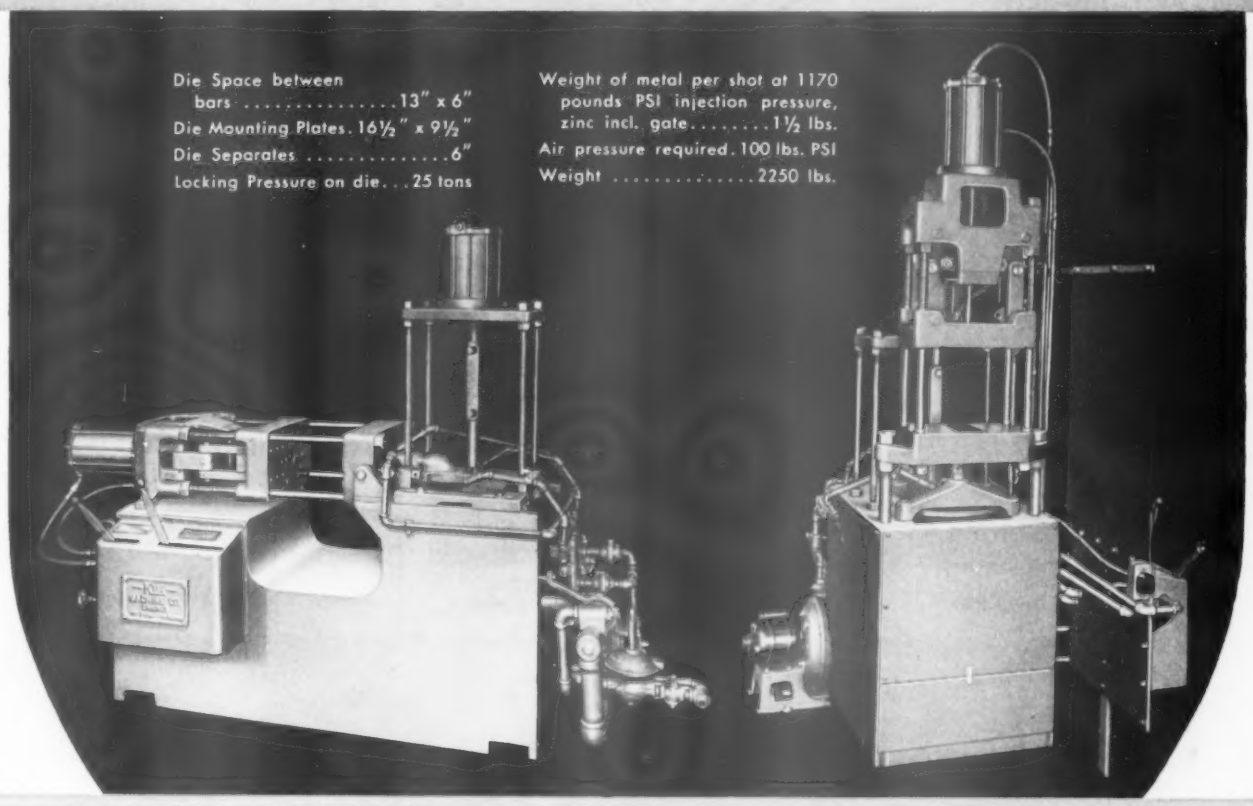
Robinson Clay Products Co., Akron, O., inaugurated a practical training program at a recent three-day refractories conference, when company executives brought together production, sales and research teams to discuss jointly the products they are responsible for producing and selling. Better methods of serving the steel, foundry, glass and ceramic industries were outlined. W. E. Robinson, company president, spoke briefly at each meeting. R. H. Anderson, in charge of the research division, showed charts and up-to-the minute research data on improvements and developments of the company's refractories products. E. A. Hertzell, refractories production superintendent, Parral, O., summed up the company's production goals in the refractories division.

KUX

The Mighty MIDGET of Die Casting Machines

THE NEW KUX MODEL K

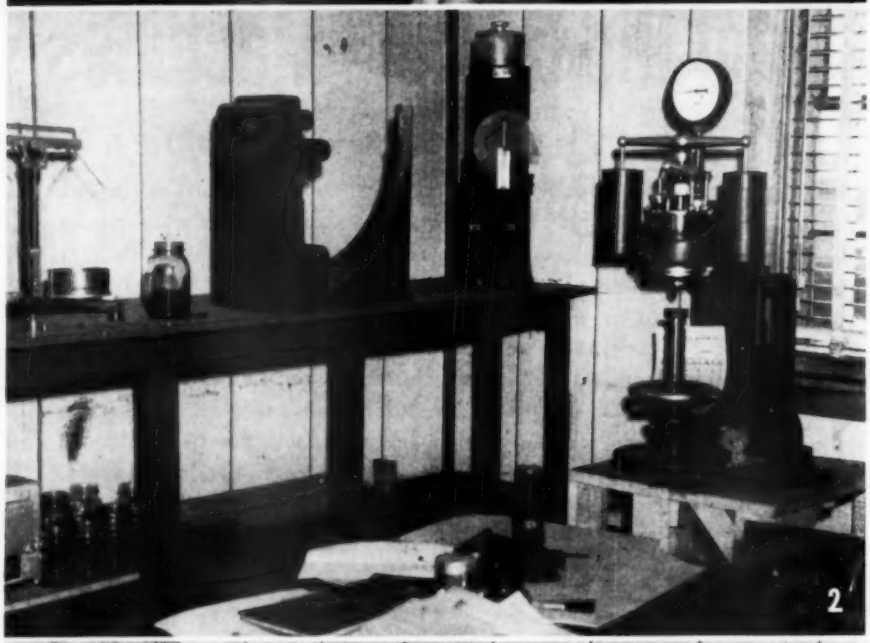
is the safest, most highly productive small die casting machine on the market! Available in horizontal or vertical center shot models, die castings weighing up to 1½ pounds in zinc are produced under high injection pressures, insuring quality, dense castings with minimum porosity. ***Compare these features:*** Center shot operation with floating nozzle always in seated contact with the die and one-piece gooseneck. Speed and power obtained by use of an air compressor to operate opening and closing of die, and metal injection plunger. Double safety lock, mechanical-electrical, prevents metal shot while die is in open position. Double toggle mechanism locking in two directions absorbs all locking pressures, operates on all four corners of die plate. Built-in ejector plate for positive ejection. Self-contained gas or oil firing unit.

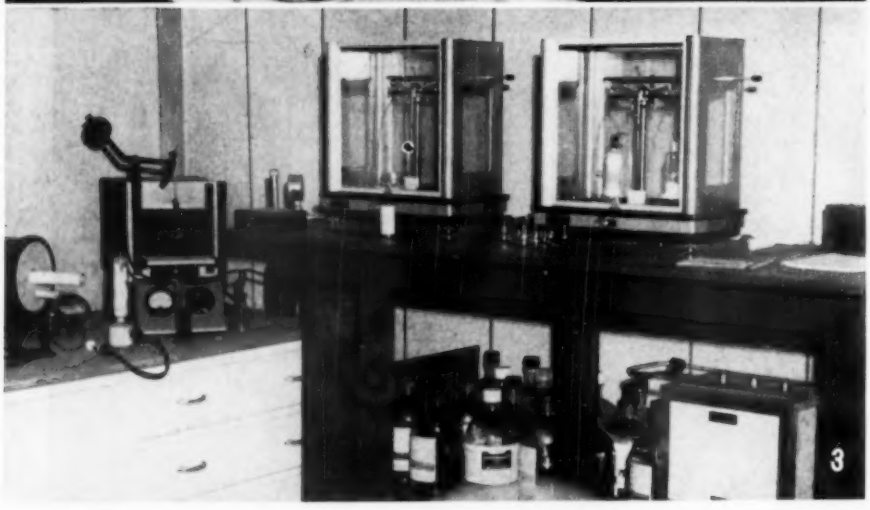

Die Space between bars . . . . . 13" x 6"
Die Mounting Plates . 16½" x 9½"
Die Separates . . . . . 6"
Locking Pressure on die . . . 25 tons
Weight of metal per shot at 1170 pounds PSI injection pressure, zinc incl. gate . . . . . 1½ lbs.
Air pressure required . 100 lbs. PSI
Weight . . . . . 2250 lbs.

Write now for an illustrated folder

KUX MACHINE COMPANY

3940 W. HARRISON STREET • CHICAGO 24, ILLINOIS





Small Foundry Employs

Modern Methods

MODEST circumstances have attended the birth of numerous foundries. But many have survived to demonstrate that a small company, when guided by progressive management, can compete successfully in the casting industry.

Few foundries had a less auspicious beginning than the Brooks Furnace Co., Albion, Mich., a producer of gray iron castings. The date was 1933, in the depths of the depression, when Ralph Brooks decided to build a foundry. His cash assets were practically nil, but he possessed the necessary determination and a wife with faith in him.

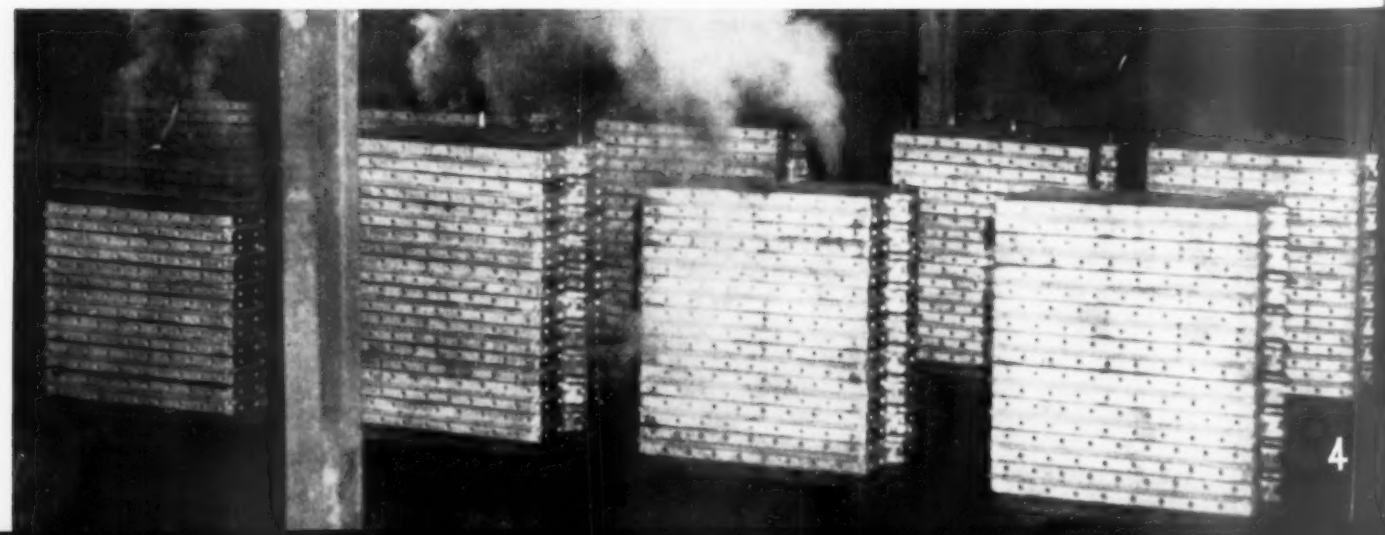
The first foundry was a home-made affair. With his own hands Mr.

(*Concluded on page* 264)

Fig. 1—Ralph Brooks and Mrs. Brooks. They built their foundry despite difficulties

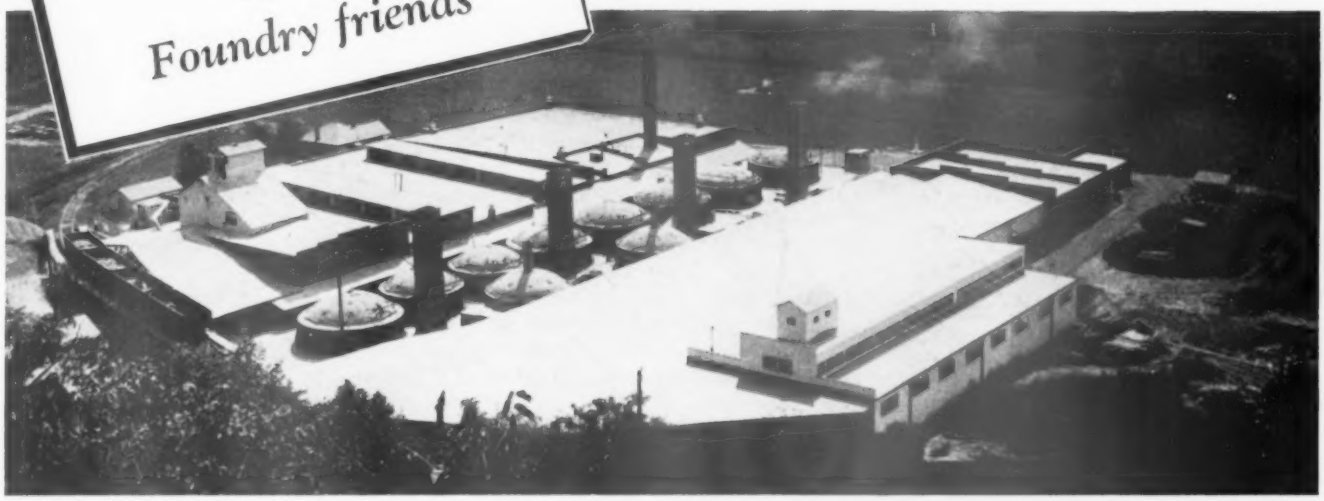
Figs. 2-3 — Modern laboratory aids process control

Fig. 4 — Stack molding saves floor space, boosts output



An Invitation to our Foundry friends

REFRACTORIES



IRONTON
Foundry Representatives

The Ironton Fire Brick Co.
Ironton, Ohio

The Ironton Fire Brick Co.
Box 4728, Jacksonville 1, Fla.

Beeman Sales & Engr. Co.
641 Buhl Bldg., Detroit 26, Mich.

Earl A. Swenson
Box 651, Columbus 16, Ohio

Firegan Sales Co.
141 W. Jackson Blvd., Chicago 4, Ill.

Henry M. Witmyer
1311 Proctor St., Baltimore Md.

Pa. Foundry Supply & Sand Co.
Ashland & East Lewis Sts.
Philadelphia 24, Pa.

M. D. Lucas
2116 Keith Bldg., Cleveland 15, Ohio

Frederic B. Stevens, Inc.
93 Stone Street, Buffalo 12, N. Y.

Carl F. Miller Co., Inc.
1217 Sixth Ave. So.
Seattle 4, Washington

Klein-Farris Co., Inc.
683 Atlantic Ave., Boston 11, Mass.

Interstate Supply & Equip. Co.
647 W. Virginia St.
Milwaukee 4, Wisc.

Robbins and Bohr
535 Chattanooga Bank Bldg.
Chattanooga 2, Tenn.

The Ironton Fire Brick Company extends a cordial invitation to its many friends in the foundry industry to visit its plant and fire clay mines.

Here at Ironton you will see a clean, modern, thoroughly integrated refractories manufacturing plant. You will see the production of machine made cupola blocks—you will see the blending of "Ironton Berlite", "Ironton Caro-Line" and "Ironton No-joint". Then an interesting 60 mile motor trip will take you to our fire clay mines at Bradmyer, Carter County, Kentucky—right in the heart of the famous Olive Hill District.

After viewing these properties, you will understand why "Ironton" is and will continue to be a dependable source of foundry refractories for many years to come.

RELIABLE REFRACTORIES

THE IRONTON FIRE BRICK COMPANY
IRONTON, OHIO

(*Concluded from page* 262)

Brooks erected a building, using field stone collected from neighboring farmers and cement bought with his wife's small salary. Total cost of material for the 80 x 80-ft building was $90. Considerable ingenuity entered into the equipping of the plant. Much of the equipment was derived from parts salvaged from local scrap yards. Shell of the first cupola consisted of oil drums.

In the early days the Brooks foundry was strictly a family affair. Ralph Brooks was the boss, his father and wife his only helpers. His father charged the cupola, his wife operated the chain fall and made the cores, and Ralph tapped the furnace and poured the molds. After producing a few plowshares, Ralph would go out and sell them to local farmers.

Conditions were discouraging, but the family managed to eke out a living. In 1938, prospects were just beginning to look brighter when the first of two disasters hit the struggling company; a windstorm tore off the roof of the building. The second blow fell in 1944 when fire destroyed the entire building, including a large number of customers' patterns. Work was started on a new and larger structure, but for a time it was necessary to pour some molds in the open.

Today the Brooks Furnace Co. still is a relatively small company but it has successfully adopted efficient operating practices. Gray iron castings produced range from 5 to 15 lb in weight, and a large share of them are parts for space heaters and other types of heating equipment. At present the foundry employs 65 men. Two cupolas are operated on alternate days, one of 8 tons per hour capacity and the other a 12-ton unit. Tapped metal is transported over a monorail to the pouring floor. Minimum daily melt usually is 35 tons. A modern and well equipped laboratory is maintained for physical and sand testing.

Molding practice in the past has been to produce molds in snap flasks. Fitted with steel band located in the flask during ramming, the molds were set out on the floor, weighted, and poured from small hand ladles. Many castings still are made in this manner, but recently the company has developed stack molding practice for those relatively shallow castings adapted to production by this method. An accompanying illustration shows a group of stacked molds after pouring. This practice, in which a single sprue feeds the entire stack, has increased production per molder from 200 to 800 castings a day, in addition to effecting a saving of one-third in floor space required to set out molds for pouring. A saving of 10 per cent in hot metal requirements compared with conventional practice also is indicated.

An efficient method is employed to handle finished castings. Pieces shaken from the molds are cleaned in an airless blast unit and ground on double stand grinders. At the final inspection station they are placed in collapsible steel wire containers and stored in the shipping room. These containers, made in Albion by the Union Steel Products Co., are known as Palletainers because they are equipped with feet which permit the load to be handled as a pallet by a fork lift truck. Easily stacked, they require a minimum of space in storage or during shipment. Several hundred of these containers are kept in regular service by the Brooks foundry.

The company delivers most castings by its own trailer truck, into which the unit loads fit snugly. At their destination the containers are knocked down for the return trip to the foundry. On shipments made by common carrier, a low freight rate on return shipment of collapsible containers makes the unitized handling of castings economical. Time saving in use of lift truck handling of unit loads, compared with former practice of manual loading and transfer of castings in bags, is said to have released four nonproductive workers to productive jobs.

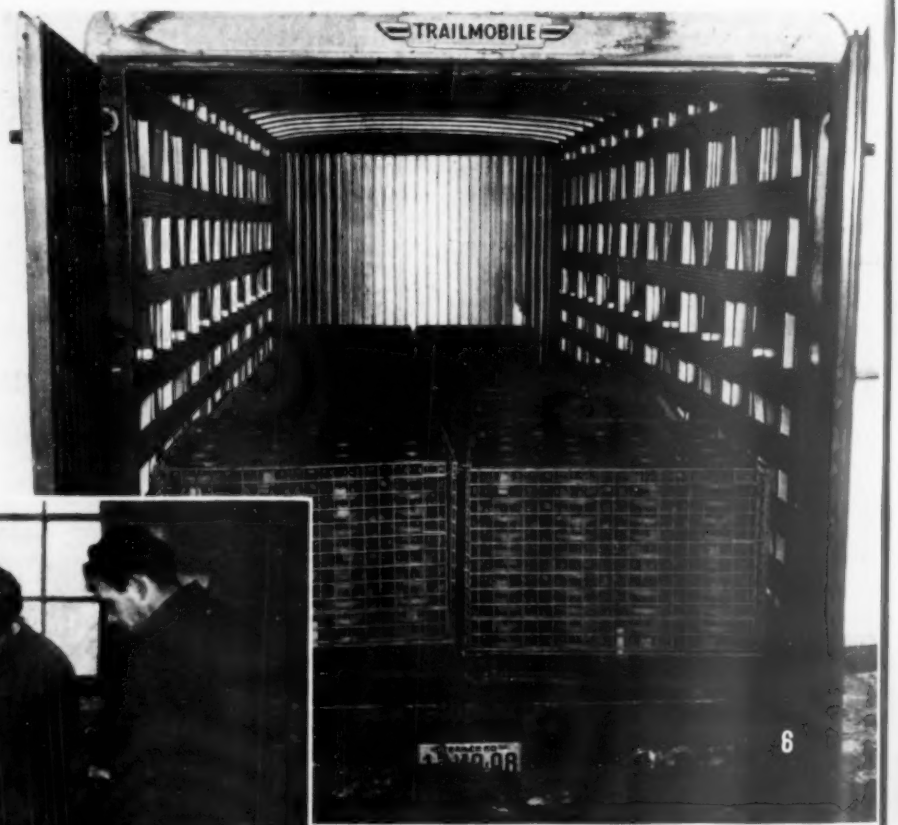


Fig. 5—Cleaned and inspected castings are stacked in these collapsible wire baskets. The containers are handled efficiently by fork truck into storage and for loading on trucks (Fig. 6) for subsequent delivery

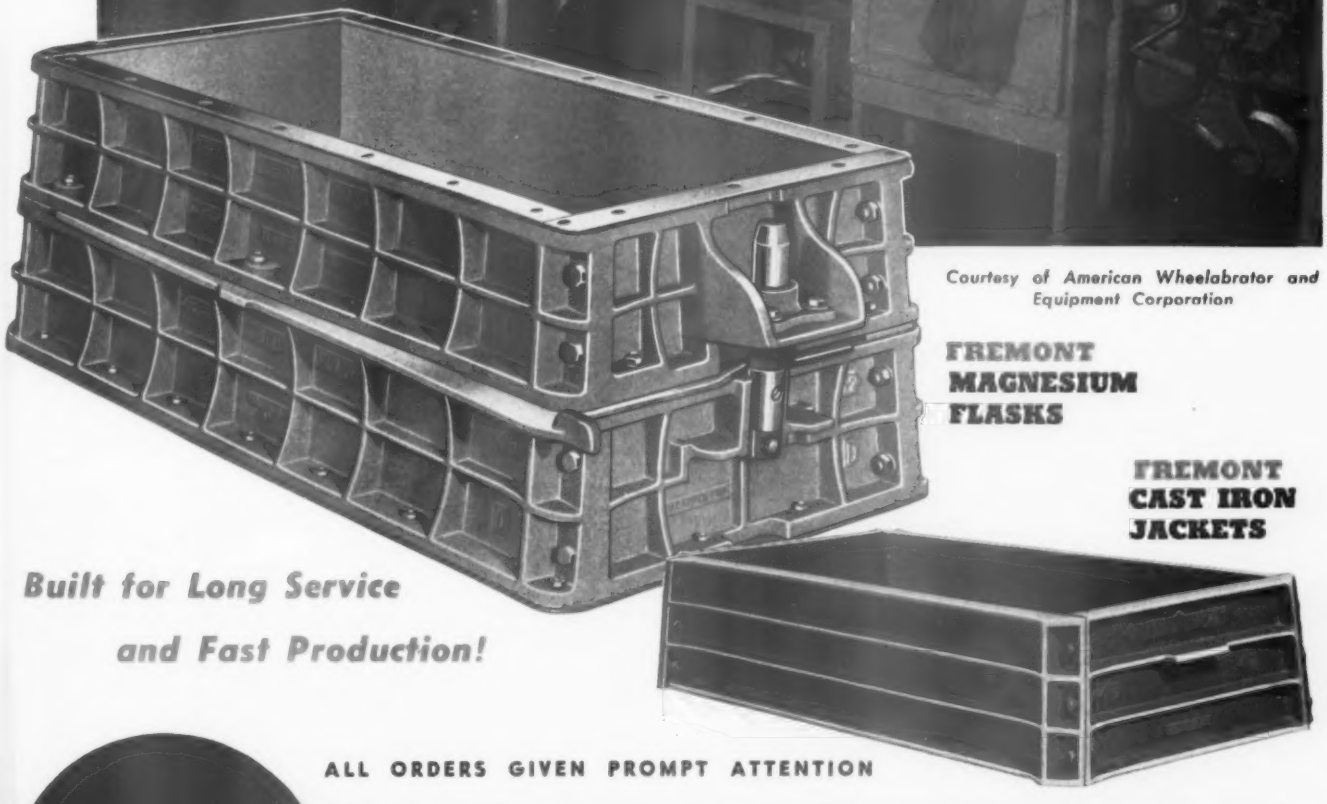
FREMONT FLASKS

Thrive on daily punishment of machine molding at American Wheelabrator

Courtesy of American Wheelabrator and Equipment Corporation

FREMONT MAGNESIUM FLASKS

FREMONT CAST IRON JACKETS



Built for Long Service and Fast Production!

ALL ORDERS GIVEN PROMPT ATTENTION

GROOVLOCK

THE FOOL-PROOF PIN

THE FREMONT FLASK CO.

Fremont, Ohio

Adventures of BILL

By PAT DWYER
Drawings by RICHEY

"SUPPOSE," I said to Bill the other night, "suppose the legal firm of Aaron, Erin, Iron, Orin & Charlie sent you a bill for $250 for professional services, all duly itemized. What would you do or, as our best public speakers say, what would be your reaction?"

"Well," Bill replied, "since I do not owe any person $250, or for that matter any fraction thereof, and furthermore since I never had any hand, act or part in the affairs of them there what-do-you-call-'ems with the vowel names—in fact, I never even heard of 'em—I probably would take the letter down to the shop and throw it in the cupola. Why should I get a letter of that kind?"

"Now we are getting into deep water. I do not know the answer to your very interesting question. I do not owe any person $250 or any fraction thereof. I never had any dealings with the vowel boys, yet the fact remains that when I arrived at this very little cot one night recently, all worn out with the toils of the day, my first helper pointed to the letter and hinted delicately that she would not leave the room if I felt inclined to take her into my confidence to the extent of reading the letter aloud, or of letting her have at least one good look at the contents. I could think of no very good reason for denying her this small pleasure. After I assured her, cross my heart and so forth, that the letter must have been intended for some other person bearing the same name, but unknown to me, she suggested I send it back to the writer with a courteous word of explanation. The next day, Saturday, a day usually and earnestly devoted to doing nothing, I wrote a gentle letter of protest. I have a copy. Want to hear it?"

"I could say NO, but what's the use? Go ahead."

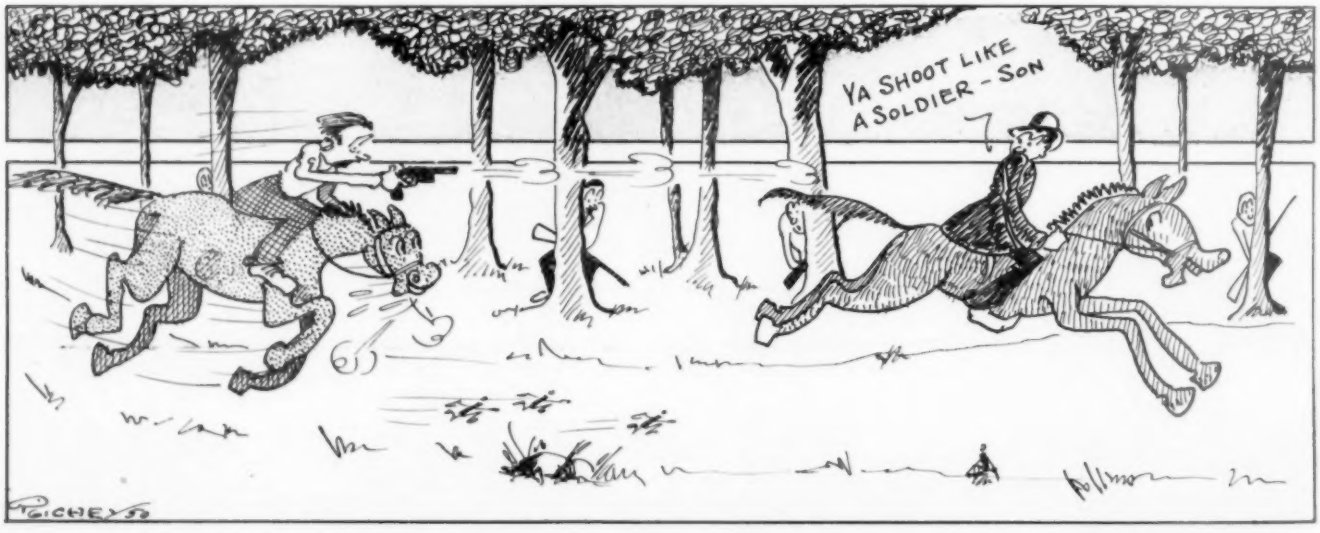
"Gentlemen," I wrote, with certain mental reservations, "quite cheerfully, if necessary, I can place my one and only trusty right hand on the Book—o.k., then I'll kiss the cover—and bravely declare that up to the receipt of your recent letter, I had not the faintest inkling of your existence. This statement is not to be taken in a derogatory sense. Hundreds, even thousands, of groups and individuals are in the same category. I don't know them. They do not know me and this balances nicely all around. Whether I ever get acquainted with some of them is a minor item in the day's work, one of these things of which we say: 'I cannot think of anything of less importance.'

"While on the subject I might add that if I never meet a comparatively small number of people, groups and individuals, it will be too soon. With your kind permission, gentlemen, this paragraph might end appropriately with the ringing remark attributed to Sir Galahad by the late A. Tennyson: My strength is as the strength of ten, because my heart is pure."

"One might wish," Bill interrupted mincingly, "might one not, that the doughty knight, or his admirer, friend and well wisher Alfie would be a little more specific. One naturally asks Ten What? Was he referring to ten men, ten mice or ten dragons? It is fairly common knowledge that in the so-called good old days these fire-and-smoke-breathing spawn of the devil, huge mouths filled with short and long teeth, were as common, as well known and as vicious and dangerous as the present hot-rod, moronic, half-baked hoodlums. The long scaly reptiles showed a special partiality for tender, juicy maidens between seventeen and twenty."

"Mr. Tennyson is not the only poet who trifles with the word 'ten.' In the late Mr. Kipling's widely quoted, and usually misquoted *Ballad of East and West,* a marauding but otherwise very likable gent named Kamal raided a military post or garrison somewhere in India. He 'lifted the colonel's mare, that is the colonel's pride.' The colonel's son promptly hops on a horse. 'And a raw, red dun was he, with the mouth of a bell, and the heart of hell, and the head of a gallows tree.' Translated into the sterling American dialect as depicted in the best sellers and on

(*Continued on page* 268)



Horse followers will be interested in this illustration of how the beetles run on the plains of Inja

BUFFALO PATTERN WORKS — Since 1893

The rest of this large equipment includes: 1 Aluminum Cope Plate; 24 Aluminum, steel-faced Core Boxes with 53 loose pieces; 6 sets of Aluminum Ram-up Core Driers in 108 pieces; 9 Aluminum, steel-faced Core Rubbing Fixtures; 1 Aluminum Core Assembly & Pasting Gauge; 1 Aluminum Core Setting Gauge; 1 complete set of Cast Iron Chills.

There were over 4 Tons of Aluminum used in this Equipment.

OUR ESTIMATING DEPARTMENT WELCOMES YOUR INQUIRIES . . .

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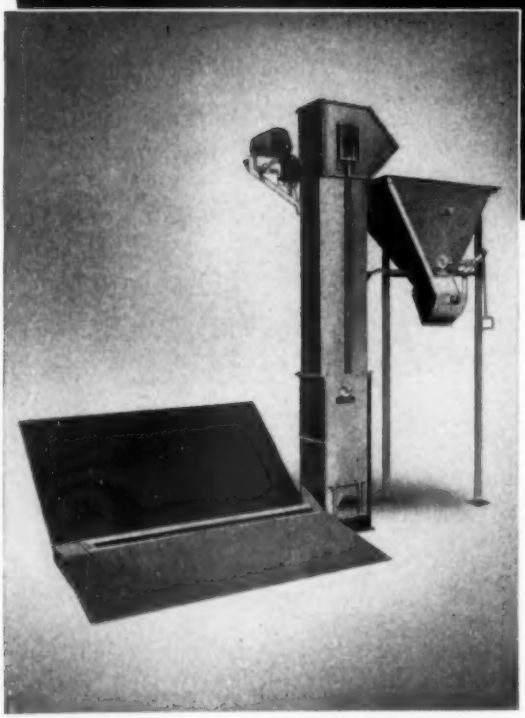
FEWER MOTIONS—MORE MOLDS

SEE HANDY SANDY

AND YOU'LL SEE WHY
USERS REPORT PRODUCTION
INCREASES OF 30% TO 80%



Handy Sandy takes the shovel from the molder's hands. It lets him devote full time to molding. It puts the sand where it is available to the molder without effort. He pulls the release and sand falls into the flask. He produces more molds per hour at a lower cost per mold.

See the Handy Sandy in operation at the Cleveland Foundry Show Booth — 1108 or send for a copy of the New Handy Sandy Bulletin.

NEWAYGO ENGINEERING COMPANY

NEWAYGO, MICHIGAN

(*Continued from page* 266)

the silver screen, that statement would appear as 'Thet thay hoss sure wuz a bad act-ah!'

"The young man chased and almost caught up with the horse thief. Took a pistol shot at him and missed. 'Ye shoot like a soldier' Kamal shouted back over his shoulder. 'Now show if ye can ride.' Yip-ee! 'It's up and over the Tongue of Jagai as blown dust devils go. The dun he fled like a stag of ten, but the mare like a barren doe.' Again the question arises, ten what? Ten legs, ten miles per hour or per gallon, or ten nights in a barroom? Very confusing to us little fellas on the side lines.

"Perhaps a little more of the double talk might help. 'The dun he leaned against the bit and slugged his head above, but the red mare played with the snaffle bars, as a maiden plays with a glove.' Now we skip a few lines, and then pick up the thread. 'They have ridden the low moon out of the sky. Their hoofs drum up the dawn. The dun he went like a wounded bull, but the mare like a new roused fawn. The dun he fell at a water course—in a woeful heap fell he, and Kamal has turned the red mare back and pulled the rider free'."

"If I might venture a feeble pun," Bill said, "the dun was done. Purry good, hey? You can skip the rest of it. How did the story come out at the end?"

"Your impatient interest is quite flattering, but you can't hurry these journeymen poets even when they get on a good bit of straight, level road."

"The technique is not confined to journeymen poets."

"The point raised by the garrulous gent in the blue serge and the hard hat may be taken up later under the heading Good and Welfare of the Order. At present we are out on the plains of Inja. Kamal knocked the pistol out of the young man's hand—small room was there to strive. 'Twas only by favor of mine,' quoth he, 'Ye rode so long alive. There was not a rock for twenty miles, there was not a clump of tree, but covered a man of my own men with his rifle cocked on his knee. If I had raised my bridle hand, as I have held it low, the little jackals that flee so fast were feasting all in a row. If I had bowed my head on my breast, as I have held it high, the kite that whistles above us now, were gorged till she could not fly.'

"The young man came back with quite a bit of brave talk of what the

raider and his gang might expect after that piece of dirty work at the crossroads. 'Give me my father's mare,' he said in conclusion. 'and I'll fight my own way back.'

"Kamal, the chivalrous crook was so pleased with the young man's attitude that he gave him the mare. 'So she shall go with a lifter's dower, my turquoise-studded rein, my broidered saddle and saddle cloth and silver stirrups twain.' The colonel's son a pistol drew and held it muzzle end. 'Ye have taken the one from a foe,' he said, 'will ye take the mate from a friend?' 'A gift for a gift,' said Kamal straight. 'A limb for the risk of a limb. Thy father has sent his son to me. I'll send my son to him!' So he whistled his son and

Isn't he the lucky little man!

gave him some fatherly advice ending up with 'And thou must make a trooper tough and hack thy way to power. Belike they will make thee Rasseldar when I am hanged at Peshawur!' "

"Now," Bill said, "that you have all that rannygazoo out of your system, perhaps you will be good enough to finish reading the letter you wrote to the cheerful raiders who wanted you to contribute $250 to the contribution barrel in their office."

"Ah, yes. The letter. Le's see, where did I leave off?" Business here of muttering through the first paragraph. "Here she is, 'I cannot think of anything of less importance.' Period. Paragraph. 'Your recent letter, a bill for $250 surprised me no end, as our overseas cousins say sometimes, and then some. A natural if mild curiosity prompts me to seek a possible reason for your action. It may be that in addressing the letter, your stenographer was (a) day dreaming of the night

FEWER MOTIONS—MORE MOLDS
SEE REDDY SANDY
NEW PORTABLE SHAKEOUT AND TEMPERING UNIT

ELIMINATES ALL SHOVELING FROM FLOOR TO FLASK AND FLASK TO FLOOR

Reddy Sandy is a new idea in Sand Conditioning. It takes the shovel from the molding floor. There is no time-consuming hand shoveling anywhere in the complete Shake-Out cycle. Reddy Sandy automatically tempers, removes tramp metal and feeds sand uniformly to any conventional sand conditioner. Just dump the flasks on the grate and Reddy Sandy does the rest.

See this amazing labor-saving machine in action at Booth 1108 at the Cleveland Foundry Show. You can't afford to miss this exhibit.

NEWAYGO | ENGINEERING COMPANY
NEWAYGO, MICHIGAN

SEE IT IN ACTION
AT THE CLEVELAND FOUNDRY SHOW
BOOTH 1108
MAY 8 to 12

DON'T REMELT DEFECTIVE CASTING
See Operating Exhibit Booth 1529

Defective Castings Salvaged

WITH THE

DOT-WELD

PROCESS

A proven method of efficiently filling ferrous and nonferrous surface defects in castings. No hard spot—4 times faster than any present method. You can also salvage machined castings that show defects. Ideal for welding aluminum to patterns.

Small to large foundries and pattern shops booster.

Leaking Pressure Castings Salvaged

WITH THE

MOGUL

CAST SEAL PROCESS

Mogul Cast Seal Process will solve your problem by circulating or by vacuum impregnation. All ferrous or nonferrous castings can be impregnated—no muss or baking—casting sealed will stand any test.

Photo shows M-1000 circulator used for testing and impregnating pump castings.

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le Rue Paul Carle
(Seine) France

METALLIZING CO. OF AMERICA
3520 West Carroll Avenue Chicago, Illinois

before, what he said, and what she said, etc., and so forth ad lib, or (b) she selected my name from the thousands in the telephone directory by the somewhat familiar but woefully inaccurate eeny-meeny-miney-mo system. With all due respect, and minus the usual gestures, the following items of information are submitted for your deep and earnest consideration: I am not one of your clients. I never was one of your clients. D. V., I hope never to be one of your clients. I trust that is quite clear. Under the circumstances, I shall thank you for an apology—even a little one! Trusting that this finds you in the pink and all that kind of thing. Yours very truly indeed.

"The day after I posted the letter, I had a very friendly reply, a handsome apology and the usual explanation that the original letter was all a bookkeeper's mistake."

"So, all's well that ends well. Since one good turn deserves another, perhaps you will be good enough to listen while I read you a bit of my correspondence. A certain citizen, whom we may as well call John Doe, because that is not his name, wrote me that he was looking for a comprehensive guide toward the manufacture of cast bronze tablets. I wrote him that so far as I knew no book has been published on the subject. On many occasions articles have been presented in THE FOUNDRY and in other technical publications. The technique of producing small plaques, practically is similar to that employed in the gray iron stove plate industry with which you are familiar. Technique employed in the production of large plates embraces many special features, and is altogether beyond the capacity of the ordinary molder. The work can be entrusted only to men skilled in the art through many years of experience.

Where only one casting is required the pattern may be wood with braces at the back. Impressions of the braces in the cope are packed with sand and slicked over after the cope is lifted off the drag. Metal patterns are employed where a number of duplicate orders are to be filled. Where the design includes ornamental features in addition to the letters, the original model is fabricated in clay. An obverse mold is made in plaster from the clay model, and then a plaster pattern is cast in the mold. No. 00 Albany molding sand generally is employed for molding ornamental castings. Other sands

(*Concluded on page* 272)

foundry cuts cost...

Schramm Model 60
Self-Propelled Crawler

Replaced 2-man Crane Scoop on this job . . . scooping sand into windrows to enable Sand Cutter to come along and cut the sand. That's not all . . .

The Compressor part of this combination is used on *down days* for plant maintenance, paint spraying, etc. Also for emergencies for operating Chipping Hammers in case of plant breakdowns.

All combined into a self-propelled unit that can easily be maneuvered around in limited floor space and other equipment.

Visit Exhibit Booth 1428 at the Foundry Show where a Schramm Industrial Compressor will be furnishing air to other exhibitors. Industrial Compressors available in sizes from ⅓ h.p. to 100 h.p.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

the Thrifty "V" FOR ALL FOUNDRY SCREENING COMBS V and V5 GYRATORY RIDDLES

SIFT · MIX · FLUFF · AERATE

Do the work of 10 to 30 MEN

For screening Moulding and Core Sands, Medium Fine, Coarse and Sticky Materials, Type "V" with 20" sieve can do the work of 10 men—Type "V5" with 36" sieve, the work of 30—and all at a power cost of less than 1c an hour!

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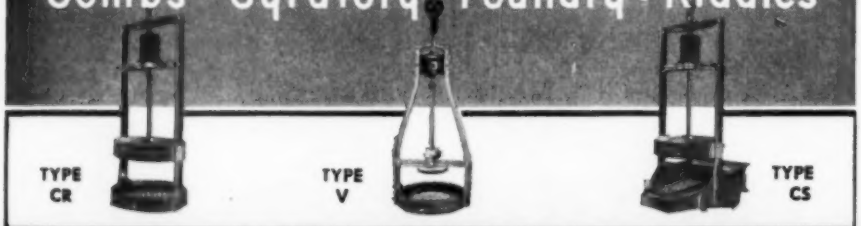

GREAT WESTERN MANUFACTURING CO.
LEAVENWORTH, KANSAS, U. S. A.

(*Concluded from page* 270)

may be employed if they possess the necessary refractoriness and fineness of grain. The finished mold face is sprayed with molasses water, or other water-soluble binder. The sprayed surface then is skin dried in any convenient manner—by charcoal fire, oil or gas open flame or torch.

In some places large tablets are cast in a vertical position. Obviously a rigid, dry sand mold in a strong iron or steel flask is required to prevent the casting from straining. The principal advantage of the method is that it insures even and proper distribution of the metal in a thin plate and over a large surface. Many foundrymen cast all tablets in a horizontal position. When the area is not too great, the casting may be gated along both sides, and in some instances also across the ends. A preferred method is to provide a number of small wedge gates on the back face of the casting. The gates are connected to long horizontal runners. The runners in turn receive metal from one or two upright sprues.

Metal composition for tablets varies to some extent depending on the color required and to some extent on the style of finish. The three following mixtures are used extensively: 1—Copper 90 per cent, zinc 7.5 per cent, tin 2.5 per cent. 2—Copper 88 per cent, zinc 3.5 per cent, tin 6 per cent, lead 2.5 per cent. 3—Copper 79 per cent, zinc 20 per cent, tin 1.00 per cent. Among the various articles on tablet manufacturing presented in THE FOUNDRY, two concerning the use of plaster for foundry patterns dealt with tablets and appeared in the September and October, 1934 issues. A chapter in the book *Gates and Risers for Castings*, published by the Penton Publishing Co., Cleveland, is devoted to pattern and foundry methods for molding and casting bronze tablets.

Book Review

Best's Safety Directory for 1950-1951, cloth, 511 pages, 8½ x 11 in., published by Alfred M. Best Co., 75 Fulton St., New York 7. Price $5.

Covering the field of safety, fire protection and control, hygiene, first aid and sanitation, this illustrated directory shows what safety products or devices to use for specific hazards, how to use them and where to get them. Its indexing and subject-grouping system facilitates location of safety products even when the user is not certain of the type or name of the product needed.

Core and Molding Sands

(*Continued from page* 145)

gular shape, while still others, classed as sub-angular, are particles whose corners have been only partially worn off. In most sands, the larger grains are usually better rounded than the small ones, the degree of roundness growing less as the grain size diminishes. Even in the Ottawa sands, the best-known example of American round-grain sands, the finest grains show a tendency toward the sub-angular shape. When even the larger grains are classed as sub-angular, the finer ones will usually be angular and show little if any signs of rounding. In some cases, the grains of nearly all the sizes consist of mixtures of the several shapes.

Steel foundry sands should consist of grains each of which is a single particle of quartz. Some sands contain many grains made up of two or more quartz particles, cemented together by silica, iron oxide or calcite. The bond between the particles is strong enough to hold them together in ordinary handling, but when heated in the mold the grains break apart. This is very undesirable, since it greatly changes the grain distribution of the sand when re-used, and the average size of the grains is important in compounding sand mixtures.

Grain Size Varies

The grain size, particularly the proportions of particles of the several grain sizes, varies widely in sand from different sources. When sorted into grain sizes by a set of sieves, some sands are found to contain nearly equal proportions of all sizes, from the coarsest to the finest. Sands from other sources may be composed to a large extent of grains of nearly equal size, the proportion of the finer and of the coarser particles being quite low.

In determining grain size in accordance with the standard AFS methods, it is necessary first to separate the sand from whatever clay is present. To do this, a sample of the sand is stirred for 5 minutes in a definite amount of water containing a small proportion of sodium hydroxide. The sample is then transferred to a glass jar and water added to a depth of 6 in. The sand is stirred up, then allowed to settle for 10 minutes, and the water siphoned off until only 1 in. remains. Water is again added to a depth of 6 in., the sand stirred up and allowed to settle for a second period of 10 minutes, and the water

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siphoned to 1-in. depth. This filling, settling and siphoning again is repeated, with the settling periods reduced to 5 minutes, until the water is clear to a depth of 5 in. below the surface after a 5-minute settling. In this way all material that will not settle at a rate of 1 in. per minute is removed. This material, defined as AFS clay, includes grains of 20 microns (0.0008-in.) or less in diameter, and actually consists in part of true clay and in part of fine particles of silica sand or silt.

The remaining sand is dried and weighed, and the percentage of AFS clay is ascertained and recorded. Grain size distribution of the washed sand then is determined by screening the sample under standard conditions through a nest of sieves of U. S. Series Equivalent Numbers 6, 12, 20, 30, 40, 50, 70, 100, 140, 200 and 270. The amount of sand remaining on each sieve, and the amount that passes through the finest sieve and is caught on the "pan", is determined, and the proportions of the original unwashed sample remaining on each sieve is calculated. The results of a determination of AFS clay and grain distribution of a typical natural-bonded sand are shown in the first three columns of Table I.

Set Sand Standards

When the AFS standards were set up, a procedure for calculating what is known as the AFS Grain Fineness Number of a sand was established. This figure is determined only on the portion of the sample remaining after separation of the clay. It is obtained by multiplying the percentages of the sand remaining on each screen and on the pan, by the multipliers shown in the fourth column of the table, adding the products together, and dividing this sum by the per cent of sand grain in the sample. The figure thus obtained is approximately the number of meshes per inch of a sieve that would just pass the entire sample if its grains were of uniform size; that is, it is the average of the sizes of grains in the sample. It is also approximately proportional to the surface area per unit weight of a sand, exclusive of the clay. In the example used for the table, the AFS grain fineness number is found to be 64.

Sands may be ordered according to clay content and AFS grain fineness number. However, the present tendency in purchasing steel foundry sands is to disregard the grain fineness number, and to specify the amount of clay and a certain grain distribution, that is, the maximum

(*Continued on page 276*)

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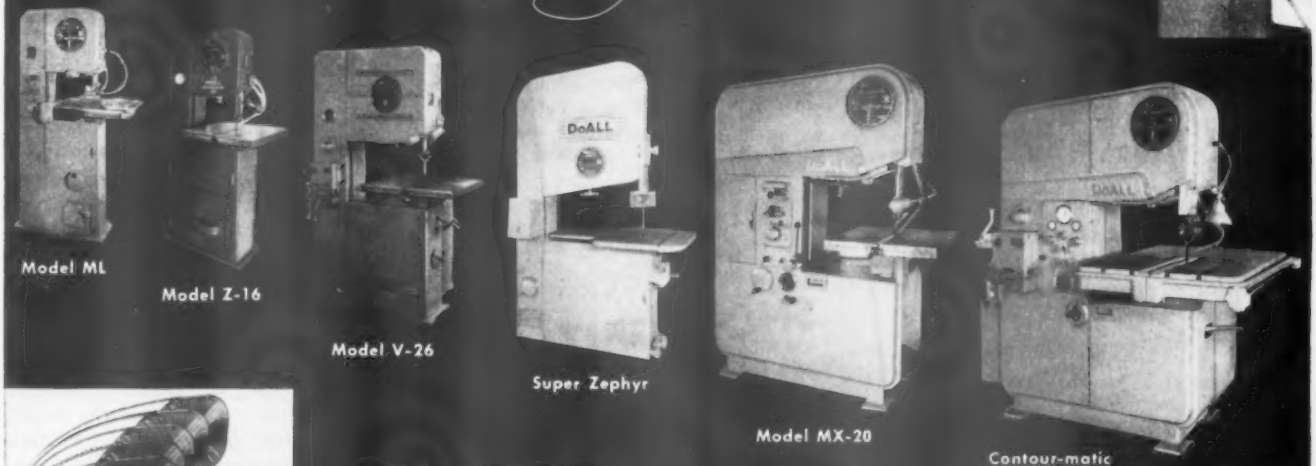

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(*Continued from page 274*)

percentages to be found on each of certain screen sizes. Usually the grain percentages are plotted against sieve numbers on graph paper, and it is specified that the sand supplied shall conform to the grain distribution shown by the graph.

Such a graph for the sand whose screen analysis is given in Table I is shown in Fig. 2. In this sand it will be noted that a high proportion of the grains, 58.6 per cent, is found on the 50, 70 and 100 mesh screens. In contrast, Table II and Fig. 3 show the screen analysis and graph of a naturally bonded sand in which only 48.5 per cent of the grains is found on three adjacent screens. In the same table and in Figs. 4 and 5 are shown screen analyses and graphs of a crude silica sand of which 70.6 per cent of the grains is found on the 30, 40 and 50 mesh screens, and of a washed and dried sand, 88 per cent of which is caught on the 70, 100 and 140 mesh screens, and over 40 per cent on the 100 mesh.

Round Grains Pack Closer

Other things being equal, round grain sands pack together more tightly than angular grain ones, so that with a given amount of ramming, the spaces between the grains are smaller and the permeability correspondingly lower in round grain than in angular grain sands. Tests also show that, for any given type of grain shape, the green and dry permeability decrease steadily as the grain size diminishes. Of even greater importance than actual grain size, however, is uniformity of grain size.

When the majority of grains in a sand are of nearly the same size, so that a large proportion of the sample is found on three adjacent screens, the permeability is considerably higher than when nearly equal proportions of the sand are caught on a number of screens. This is to be expected, because in a sand of nonuniform grain size, the smaller particles fill the interstices between the larger ones and thus reduce the permeability. For a given AFS grain fineness number, therefore, the greater the uniformity of grain size, the higher the permeability. It has also been found that round grain sands in general have a higher flowability than angular grain ones. This is due to the smaller number of points of contact between round grain sands and the resulting lower frictional resistance.

In mixing synthetic sands, a certain period is required to spread the binding materials over the surfaces

(*Continued on page 278*)

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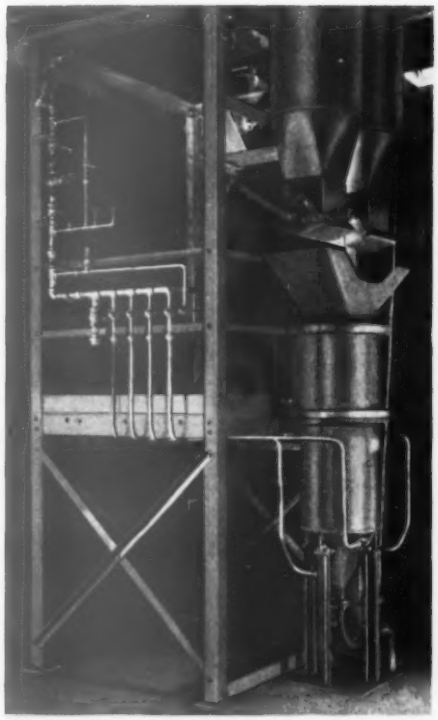

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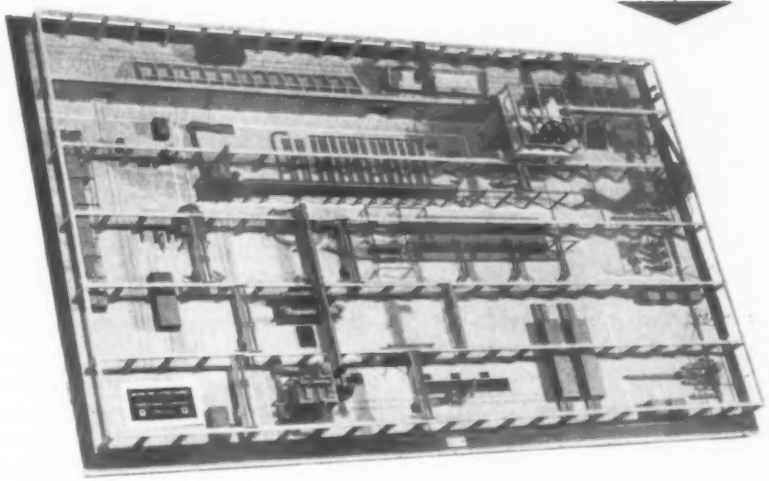

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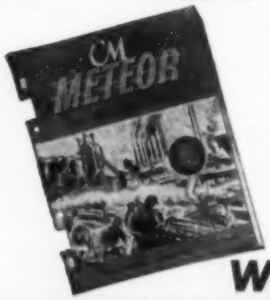

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(Continued from page 276)

of the sand grains. Up to a certain point, therefore, the strength of a synthetic sand mixture increases, the longer it is mulled. The greater the number of rams used to compact the test piece, the higher the strength, both green and dry, and the lower the permeability.

Binders are more readily and quickly distributed over the surfaces of round grains than over angular ones, and as there is more contact surface between the grains, the strength of mixtures of round grain sands and binders tends to be higher. An obvious corolary from this is that to secure a given strength, sands containing large proportions of angular grains should be mulled longer to obtain better distribution of the binders, and should be rammed harder. Briggs[3] even states that subangular grain sands are preferable to round grain ones, because they can be rammed harder, and thus they cut and scab less. To the present author's way of thinking, the latter conclusion is something of a non-sequitur.

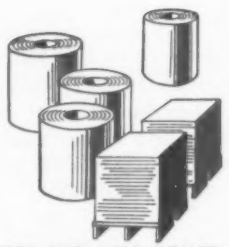
For a given amount of binder, sands of nonuniform grain size have somewhat higher compressive strength than those in which the majority of the grains are of a few screen sizes. This is because in the nonuniform sands there are more points of contact between the grains.

Chemical Composition and Refractoriness — The chemical composition of steel molding sands, aside from that of the clay portion, is usually specified as at least 98 per cent SiO_2, and grain portion of many sands will contain close to 99 per cent silica. As a rule, the greater part of the impurities which reduce the refractoriness of the sand, such as Fe_2O_3, CaO, MgO, alkalies, etc., are found in the clay portion.

The grains of comparatively pure silica in steel foundry sands theoretically have a melting point of 3142° F. Silica, however, softens at much lower temperatures, beginning at about 2550° F. This softening point varies considerably with the grain size, the finest particles softening at lower temperatures than the coarser ones. Moreover, when actually melted, pure silica is not freely fluid, being nearly as viscous at temperatures just above the melting point as when still solid.

As already stated, clays are hydrous silicates of aluminum, pure kaolin having this composition: 46.5 per cent SiO_2, 39.5 per cent Al_2O_3, 14 per cent water. When calcined to drive off the water of crystallization,

(Continued on page 280)



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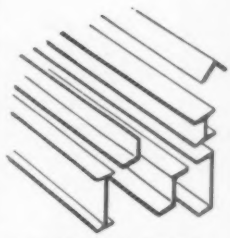
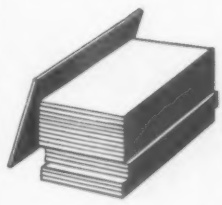
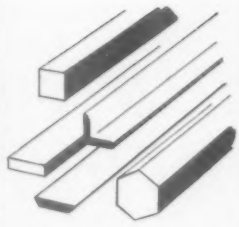


STRUCTURAL SHAPES



CARBON STEEL PLATES



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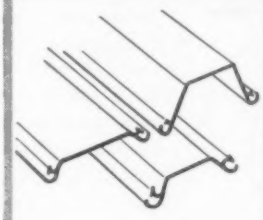
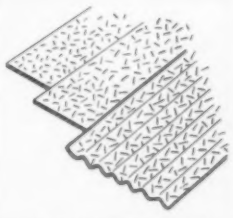


SHEET PILING



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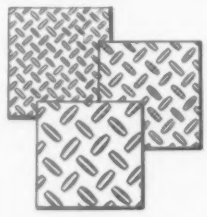

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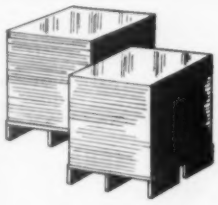

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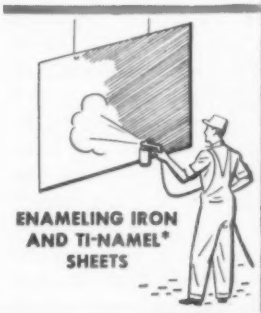

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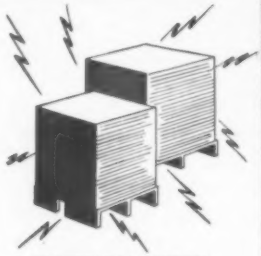

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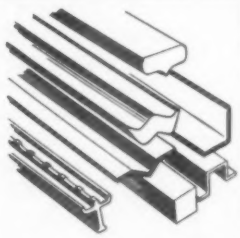

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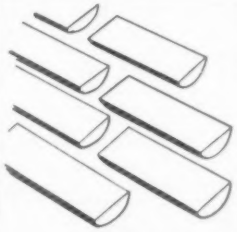

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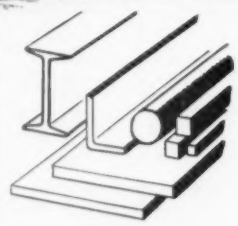

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(*Continued from page 278*)

the composition is: 54.1 per cent SiO_2, 45.9 per cent Al_2O_3, which has a melting point of about 3260° F. Clays, however, vary widely in composition, some siliceous fire clays after calcining containing as little as 21 per cent Al_2O_3, and melt at about 3200° F.

Since molding sands used in the foundry are mixtures of sand and clay, which readily combine to form new compounds when heated to the temperature of liquid steel, it is the melting points of these compounds, rather than those of silica and of clay, that govern the behavior of sand mixtures in service. The theoretical melting points of compounds of Al_2O_3 and SiO_2 are shown in Fig. 6. From this it will be noted that a material containing 5.5 per cent Al_2O_3 and 94.5 per cent SiO_2 melts at 2820° F, and that this material has the lowest melting point of any of the compounds of SiO_2 and Al_2O_3. If 88 lb of pure silica sand be mixed with 12 lb of calcined kaolin containing 45.9 per cent Al_2O_3, the mixture will contain 5.5 per cent Al_2O_3, and will have this melting point. Therefore, as Hansen[4] pointed out in 1926, molding sands containing from 12 to perhaps 15 or 16 per cent clay have a melting point only 100° F above that of 0.30 per cent carbon steel, which freezes at 2721° F, and may be poured at temperatures up to 3050 or even 3100° F.

Compound Is Liquid

The diagram shows also that in any alumina-silica mixture containing from 5.5 to 71.8 per cent Al_2O_3, some of the 5.5 per cent Al_2O_3-94.5 per cent SiO_2 compound will be present in the liquid state at all temperatures between 2820° F and that represented by the heavy curved line. Above 5.5 per cent Al_2O_3, the amount of this material will be less the higher the content of Al_2O_3, the balance of the mixture consisting of the compound $3Al_2O_3 \cdot 2SiO_2$, known as mullite. Therefore, in any molding sand mixture containing over 12 per cent clay which is exposed to the temperature of liquid steel long enough to be heated above 2820° F, there will be at least a small amount of liquid material. Below 5.5 per cent Al_2O_3, similar conditions exist, except that the solid material mixed with the liquid 5 per cent Al_2O_3 — 94.5 per cent SiO_2 compound is pure silica.

Moreover, most clays contain at least small amounts of CaO, MgO and the alkalies, soda and potash, which serve to lower their melting points and those of their combinations with silica, below the tempera-

(*Continued on page 282*)

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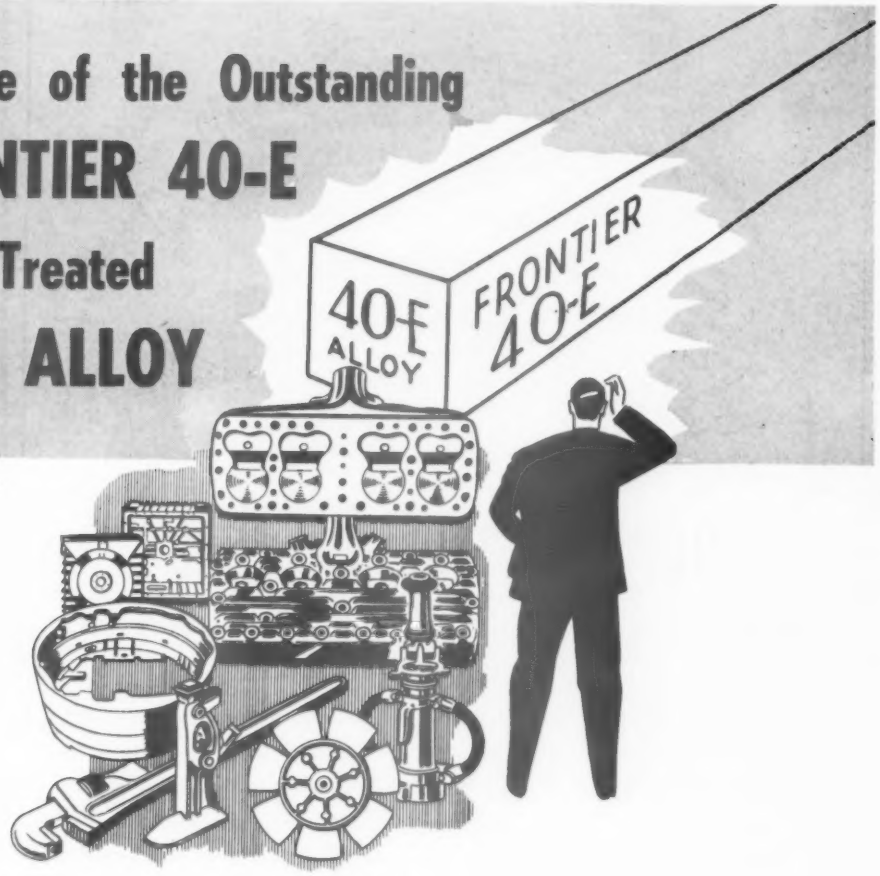

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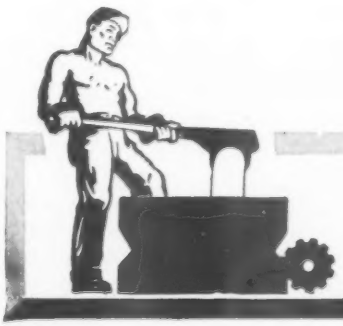

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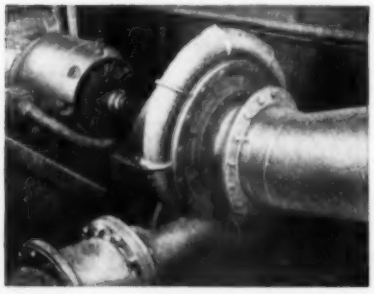

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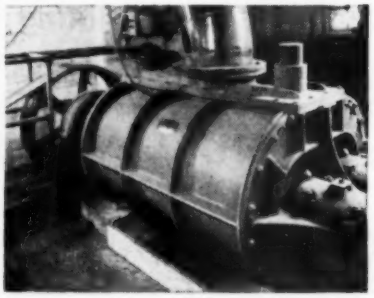

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(*Continued from page* 280)

tures shown in this diagram. It is evident, therefore, that the sand mixtures commonly used in steel foundry work must be expected to soften and sinter to a considerable extent when brought in contact with any but very light bodies of liquid steel.

Actual melting point determinations of foundry sand mixtures are of no practcial value to the foundryman and are seldom if ever made. The cone tests used in the refractory industry to find the softening point of clays are also unsuitable for application to molding sand investigations. Instead, the sintering point, that is the temperature at which the sand begins to soften, is ascertained by a standard AFS test. The apparatus for making this determination is arranged so as to press a narrow thin platinum ribbon against the regular 2 x 2-in. AFS strength test specimen under a definite pressure, for a fixed time. The platinum ribbon is heated by passing an electric current through it, and its temperature is measured by means of an optical pyrometer.

Has Two Sintering Points

At present, two definite sintering points, termed *A* and *B*, are recognized. The *A* point is the temperature at which enough sand adheres to the ribbon to bend it into a V-shape when it is lifted from the test specimen. The *B* point corresponds to the temperature at which the smallest grains of sand show signs of fusion, when examined at a magnification of 20 to 25 diameters. One of the ways to locate this point is by scraping the adhering sand from the ribbon with a mechanical scraper pressed against it under a definite load. The *B* point is defined as the lowest temperature that will cause enough sand to adhere to the ribbon to require 50 passes of the mechanical scraper for its removal.

The degree to which the sand will adhere to the casting and the extent of what is called "penetration" of the sand by the steel, cannot be definitely predicted from the results of the sintering point test, nor from any of the properties determined by other high-temperature tests. Only in a general way do these determinations indicate how given sand mixtures will act when steel at higher or lower temperatures is poured against them to form castings of various thicknesses.

Sand adherence varies all the way from a condition in which the sand does not separate freely from the steel but can be removed by sand or shot blasting, to one in which the

sand clings so tenaciously to the metal that nothing but chipping will take it off. In the latter case, the steel and the sand are intermingled by the penetration of the metal into the openings between the sand grains. Penetration of this type, moreover, may be confined to a comparatively thin layer of sand, or may extend to a depth of several inches, the sand to that depth being cemented together by the steel that has seeped into it, and at the same time being firmly attached to the casting. This condition is found particularly in small cores used to form holes in thick sections of metal, and at the intersections of two or more heavy sections where a comparatively small body of sand is partially surrounded by heavy masses of steel.

Carry On Experiments

Since the sintering point test was developed, much experimental work has been carried out in an effort to find a correlation between the sintering point and the degree of burning on or penetration of the sand in the manufacture of castings. In these investigations, the *B* point has been found to be a better index of sand behavior than the *A* point. For steel sands, the former runs from 2600 to 2750° F; the latter from 2450 to 2650° F. The temperature naturally varies with the amount of clay present, and with the fineness of the sand grains.

As a result of his studies of sand adherence, Caine[5] reports that if the majority of the fine grains of the sand, but not the larger ones, are fused to a depth of about 1/64-in., the sand will separate readily from the casting. Fusion of the larger grains produces voids large enough to permit the steel to penetrate into the sand, and the adherence is considerable. A still further degree of fusion increases the penetration to the point where the sand adheres tightly to the steel. Caine holds that if penetration is less than 0.005-in., the sand will peel freely, leaving a smooth surface on the casting; if penetration is from 0.005 to 0.015-in., the sand will peel well, but the casting surface is rougher.

With penetration of from 0.015 to 0.025-in., the adhering sand can be removed by sand blasting and scaling (i.e. separation of the sand in the scale produced by annealing); with over 0.025-in. penetration the sand must be ground off, and if the depth of penetration exceeds 0.035-in. the expense of removing the sand will generally be so great that it is advisable to scrap the casting and make a new one. The tests on which

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these generalizations are based were made on 500-lb castings, poured at successively higher temperatures in an effort to vary but one condition at a time, and the results are no doubt valid for the particular circumstances involved.

On fairly long castings of moderately heavy section, however, it is sometimes found that the sand has been penetrated to a considerably greater depth than the 0.035-in. mentioned previously, and yet will separate from the casting over a large part of the surface, being attached firmly enough to require chipping or grinding only at certain spots. Elsewhere, as mentioned by Briggs[6], the sand can be pried away from the steel with a bar or chisel. This type of penetration appears to be due to the formation of fine cracks in the wash used on the mold, through which the steel seeps, filling the voids in the more open layer of sand back of the immediate surface. At that point, perhaps, partial fusion of the sand, as mentioned by Caine, has occurred, so that the steel is able to enter the voids thus formed. The fine stringers of steel filling the cracks in the actual sand surface are readily broken to permit the cake of mingled steel and sand to be pried off the casting.

Indeed, the extent to which deep penetration is associated with the formation of cracks in the sand, into which the steel penetrates to form paper-thin sheets of amazingly large dimensions, is one of the little-understood phenomena of steel casting manufacture. This condition is particularly noticeable when bodies of sand are partially or completely surrounded by heavy masses of metal. Apparently high pressure is also a factor that has a considerable effect in producing penetration of this type.

Becomes Sand-Steel Mixture

Under particularly severe conditions a core will sometimes be criss-crossed with paper-thin interlacing sheets of steel, between which the body of the sand has been converted into a sand-steel mixture, which upon analysis is generally found to consist of roughly 50 per cent sand, 50 per cent steel. It cannot be burned out with the oxy-acetylene cutting torch, nor drilled with machine tools, and only long-continued heavy work with air hammer and chisel, or the use of the carbon-electric arc will remove it. The arc, too, is none too satisfactory, since it must be used with care to avoid cracking the metal where the heat is applied.

Veining in the manner described previously, which so often accompanies penetration of the steel into the mold sand, and which in some cases at least may be the underlying cause of the penetration, appears to occur more frequently in sands from certain areas than in almost identical sands from other parts of the country. The author has known cases where castings of the same design and size were being made in two foundries in different districts, using similar binding agents in the facing sands, but obtaining their sands from different sources. The shape of the grains in the two types of sand and the grain distribution were similar, and the chemical compositions of both sands were satisfactory, yet in one of the plants, though there was some sand penetration and burning on a certain critical spot where the sand was exposed to the most severe conditions, *veining* was almost entirely absent. In the other plant, the sand at the same places on the casting was often badly penetrated and the *veining* was very pronounced.

Just why mixtures made from the two sands, presumably rammed in

(*Concluded on page* 286)

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(*Concluded from page* 284)

much the same manner and to similar mold hardness, should vary in this way is hard to explain. As the veins are continuous flat sheets of metal that has forced its way into the mold or core, it is obvious that veining occurs by the cracking of the sand. The veins are so thin that they must have been formed when the sand was at a high temperature; steel could hardly enter so narrow an opening when the sand was cool, because it would be promptly chilled and would cease to flow. The veins are much thinner than even the smallest sections of very light castings, poured from exceedingly hot steel.

Some light is shed on the tendency of sand mixtures to crack when suddenly heated by the high-temperature shock test, but as far as the author knows only the effect of different binders is definitely known, and not that of variations in the sands from different districts. It is partly at least because of the tendency of the silica sands in certain parts of the country to thus crack and form veins in the cores and in re-entrant angles in the molds, that a proprietary material is so popular in some districts, and used to but a limited extent in others. This material consists largely or wholly of oxide of iron, and the same substance is furnished under various trade names by different concerns. The exact function of the iron oxide is not thoroughly understood, but its effect is said to be a pronounced diminuation of the tendency to form veins.

(*To be continued next month*)

References

3. Charles W. Briggs, *Metallurgy of Steel Castings*, page 341, line 27.
4. C. A. Hansen, discussion of "Some Experiments on the Refractoriness of Foundry Sands" by D. M. Trainer, *Transactions* AFS, Vol. 34, 1926, page 345.
5. J. B. Caine, "A Study of 'Burnt-on' or Adhering Sand," *Transactions* AFS, Vol. 51, 1943, page 647.
6. Charles W. Briggs, *Metallurgy of Steel Castings*, page 439, line 17.

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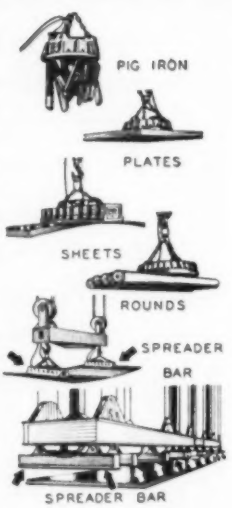

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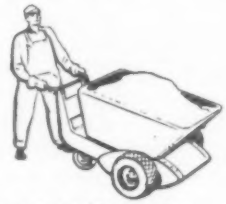

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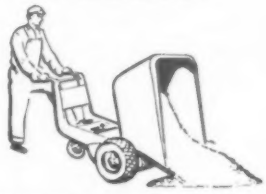

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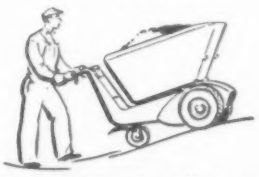

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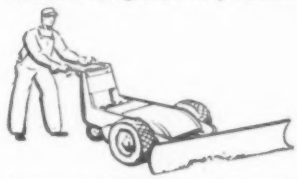

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TIN BRONZE CASTINGS

(*Continued from page* 127)

same as that of the liquid-to-solid shrinkage of all the metal, and the cavity would have much the shape shown in Fig. 2C. If there were no excessive dendritic growth, the shrinkage cavity should be rather smoothly conical or top-shaped, and the surrounding metal should be completely solid.

The above sequence of solidification is based upon three assumptions which probably never occur: First, that the chilled envelope is completely impervious; second, that the solidified metal has unlimited strength, and third, that there is no dendritic growth. That these assumptions are not true will be perfectly evident. Few metallic envelopes formed in sand are not sufficiently permeable to permit some gas to pass, especially when they are first formed and are very thin. Metal which has just solidified and is close to the freezing temperature is comparatively weak; and all metals solidify as crystals or grains and will, therefore, contain dendrites, especially if solidification has been slow. The permeability of the skin, the metal strength and the shape and size of the dendrites will be different for different metals. We have also made another untrue assumption, in that the sand mold would also have to be impervious in order to obtain solidification exactly as shown in the figures.

As stated earlier, if all the foregoing assumptions were true, the shrinkage cavity would contain no gas, but would be a vacuum. All sands are permeable to a certain extent and will allow the passage of gas or atmospheric air. As a result, atmospheric pressure will be exerted upon the outside of the solidified skin, tending to force this skin inward. As the vacuum inside increases, the pressure on the outside may overcome the strength of the comparatively weak skin and may force it inward, giving us a casting of the shape illustrated in Fig. 3A. In this case, the shrinkage cavity will be smaller than that shown in Fig. 2A by a volume equal to the amount which the casting walls were drawn in.

Growth Is Rapid

If the dendritic growth is very rapid, as it tends to be in the tin bronzes, the dendritic branches may reach across the mold cavity and help brace the walls, thus preventing the sides from being forced inward by atmospheric pressure. These heavy dendritic branches will probably prevent, to a considerable extent, the feeding of molten metal into the lower part of the mold cavity; so that instead of a smooth conical shrinkage, we will probably have a small cavity with rough interior walls. Most of the shrinkage, although having the same total volume as before, will be scattered throughout the casting in small, often microscopic, cavities lying between the dendrites and hence commonly known as interdendritic shrinkage. This shrinkage would be distributed somewhat as shown in Fig. 3B.

Coming back to the weak skin, it will be evident that this skin will tend to be thinner at the top of the mold cavity where the molten metal has shrunk away in cooling, leaving no more metal to solidify at this point and increase the thickness. This very thin spot is often broken by the force of the atmospheric pressure on top, aided by the vacuum within. The air which enters will counteract the vacuum and prevent drawing in of the sides. This pressure, added to the weight of the molten metal in the

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mold cavity, will tend to force this metal down into the mold, through and between the dendrites. The probable result will be that the shrinkage cavity or "pipe" will be somewhat shallower than that shown in Fig. 2C; more like that illustrated by Fig. 3C, although the volume of this shallow cavity should be the same as that of the deeper one.

A little further explanation is due in this connection. If the mold cavity is entirely sealed off from the atmosphere, we have only the weight of the molten metal in the mold cavity to force the metal between the dendrites. If the metal at the top of the cavity is broken, however, as shown in Fig. 3C, we have atmospheric pressure, amounting to 14 psi, added to the weight of the metal. In a closed mold, we will probably have some shrinkage porosity below the pipe and in the metal around the main shrinkage cavity. With the additional atmospheric pressure, such shrinkage porosity is often prevented and usually reduced.

Conditions Under Control

The foregoing description has purposely omitted any consideration as to the method of filling the mold. A study of Figs. 2 and 3 will show immediately that we have not obtained our goal of producing a solid rectangular casting. The amount and extent of the unsoundness depends to a certain extent upon conditions which may be under our control. In working out methods of obtaining the required soundness, the reader is referred to work reported by Brinson and Duma[3] which indicated that, if we can keep the molten metal in the mold cavity in intimate contact with the atmospheric pressure, we can usually obtain sound metal at the bottom of a vertical, uniform mold cavity. This sound metal will extend to a height approximately two to three times the thickness of the casting section. The amount of shrinkage which occurs above this solid portion will depend upon the method used to run the metal into the mold and upon the method of feeding.

To fill the whole mold with solid metal, it will be evident that all mold cavities shown must be extended upward a sufficient distance to allow for the depth of the shrinkage cavity at the top. This added metal is later cut off, leaving what we hope will be sound metal having the specified dimensions. Whether it is really sound or not will depend upon several considerations which may be deduced from the previous explanation. Of first and probably greatest importance is the requirement that we must always have a supply of molten metal at the top of the mold cavity and the surface of this molten metal must be open to the atmosphere, so that the combined pressure of the head of metal and the atmosphere will force the molten metal down into the mold cavity and between the dendrites which are continually forming. As our whole discussion concerns tin bronzes, which solidify with rapidly forming, widely branching dendrites, we must keep in mind that we will always have these dendritic branches to contend with.

Probably the simplest way to illustrate solidification is shown in Fig. 1, where we are casting a vertical cylinder. If all variables are kept under control, the cylinder will be sound. It is probably safe to say that it is the only method of casting a completely sound bronze, pressure-resistant cylinder of any appreciable size. In the method illustrated, the part is molded vertically either in green or dry sand or in cores. For reasons to be explained later, the drag portion of

AJAX Push-Button Control OF MOLTEN METAL

Photo at left: A cross section of unit showing discharge pipe (A), induction channel where pressure is created (B), pouring spout (C), and mold (D).

The large photo shows the Ajax-Tama Electromagnetic Pump at work. Control cubicle in rear maintains temperature, energizes pump from electric timer, electric eye, or similar devices.
Photo at right: Closeup of the pumping unit.

THE AJAX ELECTROMAGNETIC MOLTEN METAL PUMP*

The Ajax-Tama Electromagnetic Pump is used in "around-the-clock" operations at the assembly lines of a number of prominent plants in the United States for the mass production of high precision aluminum alloy castings.

Using electromagnetic pressure created by high current in the loop of an Ajax Twin Coil Unit, the molten metal is automatically controlled and channeled in one direction. From the bottom of the hearth (see cross section drawing) through an electrically heated refractory pipe, the pure metal is lifted to the mold. The flow is completely controlled by electric current.

Maintaining excellent weight accuracy, castings of from ¼ to 30 pounds, or more, can be poured in continuous operation. Special problems calling for a flow of hundreds of pounds per minute can also be handled by this same unit. The electromagnetic pump can be used as a reservoir to maintain molten metal at constant, accurate temperatures . . . for complete information contact Ajax.

* Patents applied for and allowed.

AJAX ENGINEERING CORPORATION
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AJAX TAMA-WYATT INDUCTION MELTING FURNACE

Associate Companies: AJAX METAL COMPANY, Non-Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

the mold should be of dry sand or of cores, or at least a core sand ring should be placed at the bottom of the mold cavity. The cope is fitted with a continuous circular runner with a number of pencil gates connecting directly with the top of the mold cavity. Vents must be provided to equalize the pressure in the mold, also to carry off air and mold gases. The number and size of the pencil gates must be selected with considerable care to provide exactly the correct speed of metal flow into the mold. The metal is poured directly into the circular runner, permitting it to flow into the cavity at a uniform speed all around the mold.

If the temperature is correct, the first metal entering the mold will begin to solidify immediately, with only a few inches of molten metal above it. This shallow reservoir of molten metal, aided by the atmospheric pressure on its surface, will provide complete feeding between the dendrites of the solidifying metal below.

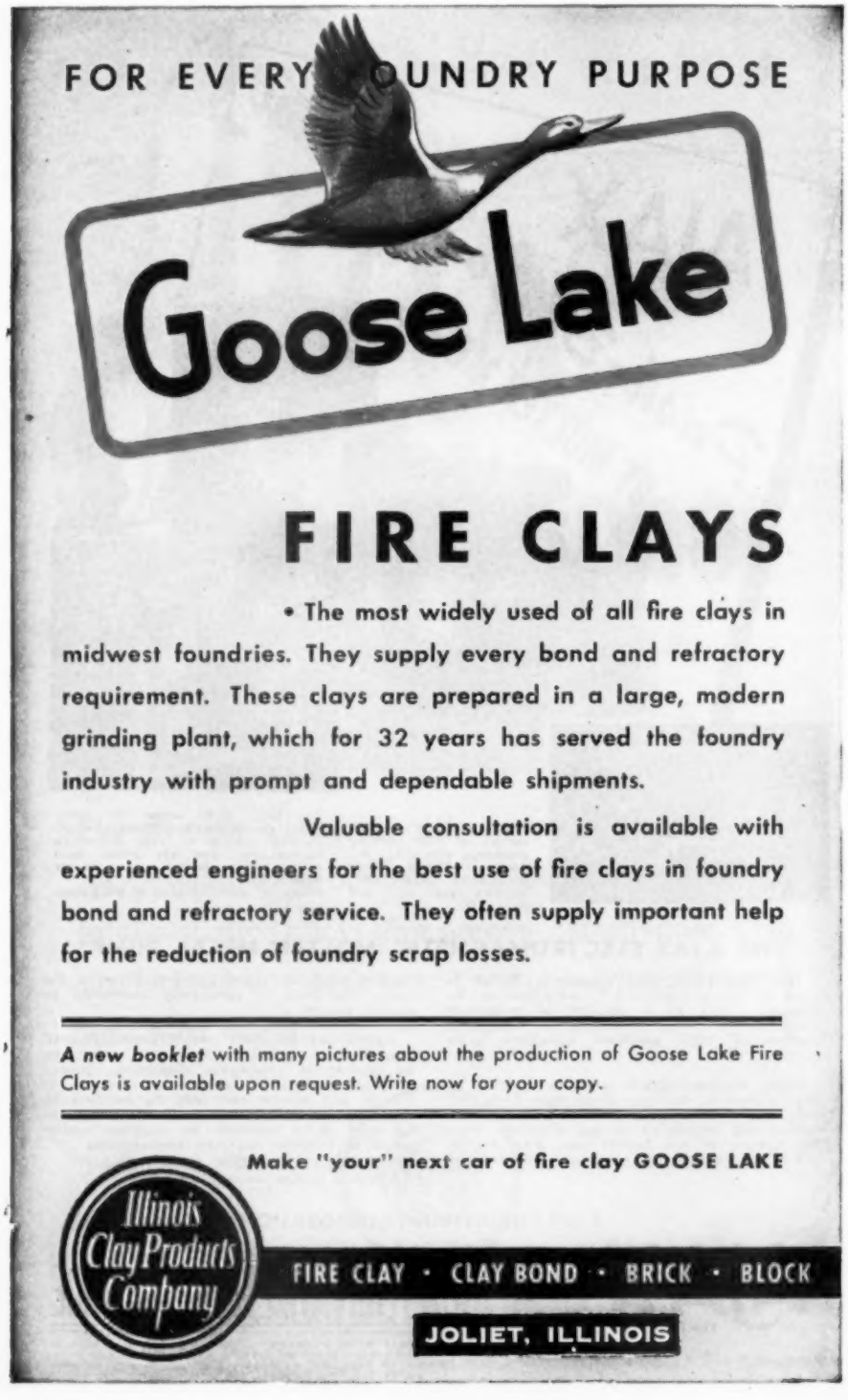
The necessary conditions for this method of pouring are that the metal is at such a temperature that it is almost ready to freeze as soon as it reaches the bottom of the mold cavity; also that total area of the gating controls the speed of metal entry to such an extent that there is never more than 2 to 4 inches of molten metal lying on top of the solidified metal. In other words, conditions must be such that the molten metal freezes as fast as it enters the mold. The mold cavity must be extended above the designed top of the casting to take care of the final shrinkage at the top after the mold has been entirely filled, approximately as indicated by the dotted line at A in Fig. 1.

There are a number of disadvantages to the use of the above method in a production shop. Some of these disadvantages are real, but after using the method for a while, most of the arguments against it will be found to have little foundation. The first of these supposed disadvantages would probably be the close temperature control required. It is necessary to have closely controlled melting conditions and to control the pouring temperature within a maximum of about 25 degrees. After a little practice, however, this control will cease to offer any unsurmountable difficulty. Furthermore, such a disadvantage can hardly be considered as being limited to this particular method because just as close control is necessary to obtain sound bronze castings regardless of the method of molding and pouring. The correct temperature will vary with the size and shape of the casting and must be standardized for each particular design.

Select Gating System

The gating system must also be carefully selected to obtain the correct speed for filling the mold. It has been the author's experience that, in most cases, too many gates are supplied, or they are too large, thus permitting the mold to fill much too quickly. Rapid pouring will entirely defeat the advantages of this method. The close control of metal temperature will usually preclude the possibility of pouring more than one casting of the same design from a single ladle of metal.

One disadvantage of this method which the author has heard expressed a number of times is that the metal, dropping clear from the top of the mold cavity, will dislodge considerable sand which will probably remain in the casting. This fear of sand dislodgement has been carried to extremes by certain foundrymen who have stated that they "would positively not allow metal to drop in a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mold." The evident question to this statement is "how are we going to get the metal down there if we don't drop it, unless we are using some vacuum method whereby we suck the metal up into the mold from the ladle?" To allay such fears, however, it is suggested that a strong baked core be placed in the bottom of the mold. Better yet, a ring of chills or a solid ring chill of metal or graphite may be used. Such a chill will start solidification at the bottom and will be of considerable aid in initiating directional solidification, especially as the first metal poured will be somewhat hotter than that entering later.

The description offered so far serves to point out the desirability of obtaining correct directional solidification, which is necessary in order to obtain a casting without shrinkage porosity. Stated in simple terms, directional solidification consists of obtaining suitable temperature differentials within a mold cavity, whereby the metal freezes first at a point farthest removed from the riser and freezes progressively toward the riser, with each portion above feeding the solidifying metal below and finally having sufficient molten metal at the top to feed completely the last metal to solidify in the casting. The shrinkage should be confined entirely to the risers which are finally removed.

Risers Are Required

It is evident that risers are required to provide final feeding, but before discussing the design of such risers, let us consider the various methods of conducting metal into the mold cavity. In the case of the cylinder illustrated in Fig. 1, it was explained that metal should enter the mold slowly and that the advantages of the method would be defeated if the metal was to be fed too rapidly, thus filling the mold completely before progressive solidification had started.

Let us consider the sequence of solidification if the mold in Fig. 1 were filled with molten metal before solidification could start at the bottom. Much as described in connection with Fig. 2A, a chilled skin would form all around the mold cavity. As long as molten metal is in contact with this chilled skin, columnar crystals will tend to grow out from the sides. Finally, in the case of a large uniform section, these columnar crystals will bridge across the intervening space and will offer considerable resistance to the flow of molten metal past them. In such a large expanse, one could hardly expect columnar growth to be exactly uniform throughout. In certain isolated areas, the growth would be faster, the metal becoming solid across the whole wall section at these points. Feeding to points immediately below would be shut off; there would be insufficient metal to overcome the liquid-solid shrinkage at these points, and we would have areas of voids at such unfed sections between the casting surfaces.

This type of shrinkage, lying at the thermal centerline of the casting wall, is known as "centerline shrinkage" and is common to all cast metals. It is especially evident in large sections with uniform walls. In the case of bronze, because of the inherent tendency of the dendrites to spread rapidly and to interlace and thus shut off feeding, we are likely to have porosity extending most of the way through the casting, except in the chilled skin or other chilled or otherwise rapidly cooled areas.

According to Brinson and Duma, such a uniform casting can be expected to have solid metal at the bottom and extending up for a distance approximately twice that of the thickness of the casting wall, this

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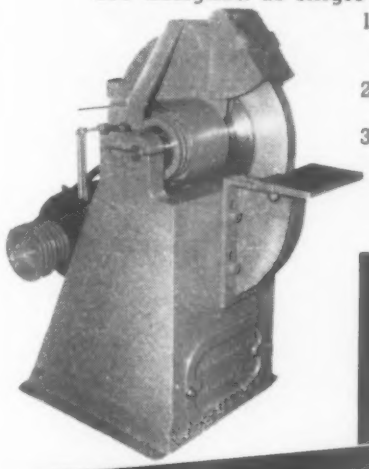
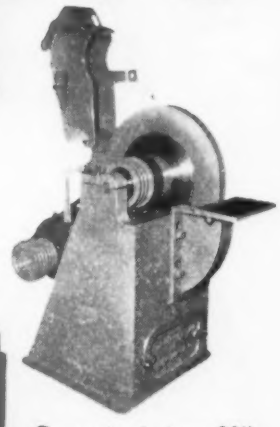
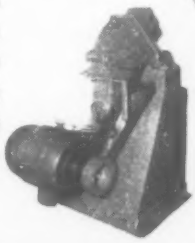


FOX

HIGH SPEED STAND GRINDERS





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sound metal having been completely fed by the metal above. This fact is of considerable value in deciding upon the correct placement of gates and risers.

(To be continued next month)

Note: The opinions expressed herein are those of the author and do not necessarily express those of the Department of the Navy.

References

1. "Solidification Mechanism of Tin Bronzes," THE FOUNDRY, Vol. 76, No. 4, April, 1948, page 68 and No. 5, May, 1948, page 130.
2. "Effect of Gases on Tin Bronze," THE FOUNDRY, Vol. 76, No. 11, Nov., 1948, page 70 and No. 12, December, 1948, page 96.
3. *Transactions*, American Foundrymen's Society, Vol. 50, No. 3, March 1943, page 657.

Pittsburgh Meeting Of ASTM Committees

Nearly 1000 attended 300 meetings of technical committees of the American Society for Testing Materials at a meeting held in Pittsburgh, Feb. 27 to Mar. 3. New research work was discussed, and many new specifications and tests for materials and numerous revisions were completed.

Subcommittee VIII of Committee A-1 on Steel has written and reviewed a new specification for steel castings for steam turbine casings which is expected to be published in 1950. A group has been appointed to draft a specification for austenitic alloy steel castings for high temperature service since those are not included in A 217-49T, a consolidation of A 157-44 for Alloy-steel Castings for Valves, Flanges and Fittings for High Temperature Service, and A 217 for Alloy-steel Castings Suitable for Fusion Welding for High Temperature Service. A 217-49T covers only ferritic grades while A 157-44 included several austenitic grades.

Committee A-10 on Iron-Chromium-Nickel and Related Alloys agreed to act upon a request for specifications for centrifugally cast alloy iron pipe, and to seek the co-operation of Committee A-1 on Steel in that matter. Committee E-9 on Fatigue reported that after almost three years of preparation the *Manual on Fatigue* now has been published. It contains information on symbols and nomenclature, fatigue testing machines, preparation of specimens, test procedure and similar information on fatigue testing of both ferrous and nonferrous materials.

Subcommittee II of Committee E-7 on Non-Destructive Testing announced that suitable specimen blocks for preparation of standard radiographic negatives will be prepared by three co-operating firms including Babcock & Wilcox Co., Combustion Engineering-Superheater Inc., and M. W. Kellogg Co. Blocks will become the permanent property of ASTM and radiographic negatives of the blocks will be prepared through the entire range of standard x-ray equipment including also cobalt^{60} radiation. A method for magnetic particle testing of steel castings is being considered in Subcommittee III to replace specification A 272-44T, Tentative Method of Magnetic Particle Testing and Inspection of Commercial Steel Castings.

How To Sell to the Government

"Selling to the Government," recently published by the Chamber of Commerce of the United States, Washington, simplifies many of the problems encountered by businessmen who want to sell to the federal government. It shows who buys for the government, where to get the facts, what to do, and how the government buys. Appendices list government and private sources of additional information on "who buys what," specifications, and principal procurement laws and regulations.

Careful measurement of molten metal temperatures does it! Close check on every heat eliminates most causes of misruns, shrinkage, cold shuts and pin holes!

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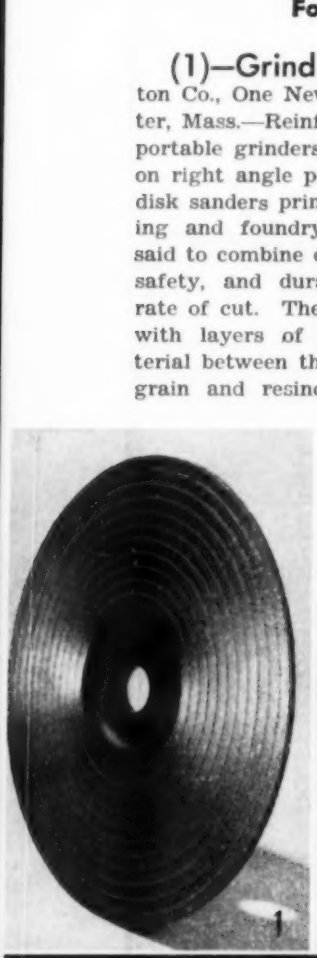
New EQUIPMENT and Supplies

For Additional Information on these Items Use Reply Card—Page 297

(1)—Grinding Wheel: Norton Co., One New Bond St., Worcester, Mass.—Reinforced hub wheel for portable grinders is designed for use on right angle portable grinders and disk sanders primarily in weld grinding and foundry operations. It is said to combine exceptional strength, safety, and durability with a fast rate of cut. The wheel is reinforced with layers of strong fibrous material between the layers of abrasive grain and resinoid bond. In addition, the wheel has a strong composition safety web molded onto the back which serves to hold the wheel together in the event of accidental breakage until the machine can be stopped and the wheel removed.

For more Details Circle No. 1—Page 297



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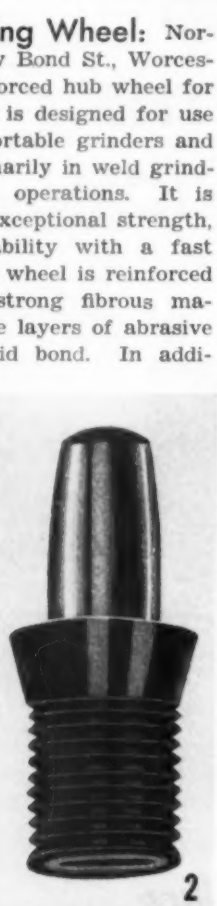

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(2)—Corebox Pin: Martin Engineering Co., 704 Rose St., Kewanee, Ill. — Rubber-mounted, rubber-tipped steel corebox pin is said not to cause damage to the parting line. It is claimed that the threaded rubber body of the new pin will not loosen or unscrew from the box. An additional feature is the fact that the pin will strip out of the corebox if the box is closed forcibly with the pins out of register. The pin is available in four sizes to fit standard taper reamed and tapped holes.

For more Details Circle No. 2—Page 297

(3)—Metal Analysis: Eberbach & Sons Co., 20 East Liberty St., Ann Arbor, Mich.—New instrument developed at Battelle Memorial Institute, Columbus, O., is said to make practical analyses which have been considered too costly for routine laboratory use. It is useful for determining aluminum in steel and in zinc-base alloys; zirconium in iron and steel; and uranium, alkaline earths, and alkali metals in alloys of iron, copper, nickel, chromium, zinc, molybdenum, and other metals. The instrument employs the mercury-cathode principle for separating interfering metals. A magnetic circuit causes rapid countercurrent stirring at the mercury-electrolyte interface, continuous cleaning of the mercury surface, and minimum resolution of the deposited metals.

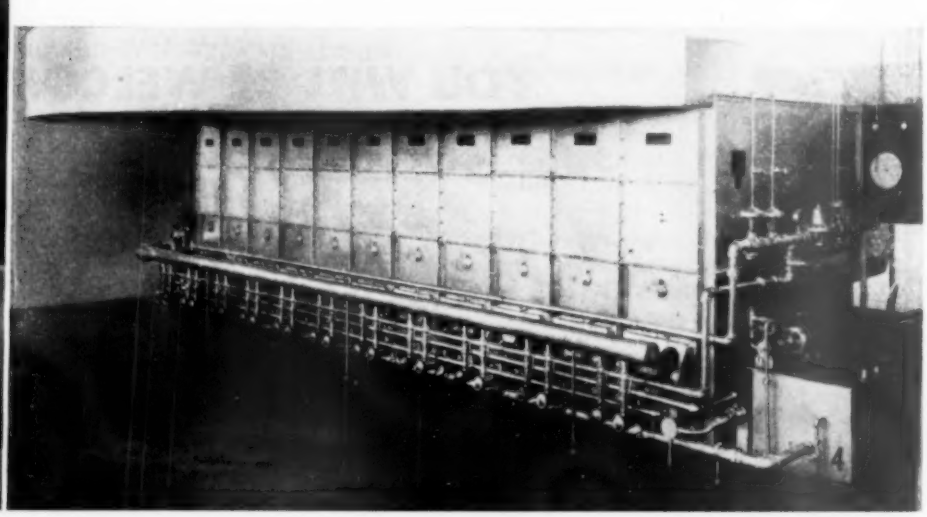
For more Details Circle No. 3—Page 297

3

(4)—Cupola Hot Blast: J. O. Ross Engneering Corp., 350 Madison Ave., New York 17—Hot blast system takes cold air from present blower, passes it through oil or gas fired air heaters and delivers it to cupola at approximately 450° F. Substantial savings in coke, elimination of bridging, increased melting rate, and reduced labor and maintenance costs have been attributed to this air preheating method. With the air under automatic temperature control, a perfectly uniform blast temperature is maintained. The system is said to be easily and quickly installed without interruption to melting schedule.

For more Details Circle No. 4—Page 297

Electrodes: Harnischfeger Corp., Welding Division, 4405 National Ave., Milwaukee 14—New series of low-hydrogen electrodes consists of 14 different types which have been tested in the company's laboratory and in its own welding production as well as in the field. The coatings were developed to produce deposits low in hydrogen thereby eliminating the under-bead crack-



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ing. The electrodes are said to produce good welds on alloy steels, including steel castings. They have a moderate penetrating arc with an easy-to-remove slag.

For more Details Circle No. 5—Page 297

Sander: Buckeye Tools Corp., 21 West Apple St., Dayton 1, O.—Portable air-powered sander is designed for medium duty sanding or light duty cup wheel grinding. Although smaller and 10 per cent lighter than previous models of equal capacity, the new unit has 25 per cent more power, as proved in a number of field tests. The sander will be available in five models with speeds of 2400, 3600, 4500, 6000 and 7500 rpm, and is designed for use with 5-in. or 7-in. sanding pads, depending upon model selected. For cup wheel grinding, wheel sizes of 4, 5 or 6 in. are indicated by the specifications.

For more Details Circle No. 6—Page 297

Gas Regulator: National Cylinder Gas Co., 840 North Michigan Ave., Chicago 11—New type welding and cutting regulator is designed to maintain constant volume and pressure of gas, without requiring two-stage reduction. The pressure compensating unit in the regulator consists of a small gas chamber below the valve seat, a reinforced rubber sealing disk at the bottom of the chamber, and a pin which rests between the disk and the back cap of the regulator. Gas at cylinder pressure is admitted to the chamber through an orifice in the seat. Force of gas in the chamber moves the seat gradually away from the nozzle as supply pressure decreases, permitting a constant rate of flow.

For more Details Circle No. 7—Page 297

Working Platform: William Moss & Sons Ltd., Mechanical Developments Division, North Circular Rd., Cricklewood, London, N. W. 2, England—One-man operated working platform has a maximum height of 17 ft, which allows the operator to work at positions of 22 to 23 ft above the ground. The equipment utilizes a triple hydraulic ram and a tubular framework which "scissors" to permit maneuvering through confined spaces. The platform is 2 ft, 3 in. square and is provided with toe boards and handrails which fold down for transit and movement under arches 6 ft, 6 in. high. A manual hydraulic pump actuated by the operator while standing on the platform gives full elevation in 2 minutes; descent is effected in 45 seconds. Rubber-tired casters provide mobility; when in operation four screw jacks give a firm foundation, even on a sloping floor.

For more Details Circle No. 8—Page 297

Chart Recorder: Wheelco Instrument Co., 847 West Harrison St., Chicago 7—Air-operated strip chart recorder has been incorporated in the company's line of indicating, controlling and recording instruments. Temperature, speed, flow, pressure, static grain loads, alternating and/or direct current volts, amperes, etc., are said to be measured accurately and simply. The control function is performed by air power operating diaphragm motors connected to valves, dampers, levers and pistons.

For more Details Circle No. 9—Page 297

Dynamometers: W. C. Dillon & Co., 5410 West Harrison St., Chicago 44—High-capacity traction type dynamometers in 30,000, 40,000 and 50,000 lb ranges are used for checking draw-bar pull, weight of bulky objects, tension on ropes or cables, static loads, and other similar applications. The 10-in. dials are calibrated in 250-lb divisions on the 50,000-lb model and 200-lb divisions on the other two models. Mechanism consists of a calibrated tool steel beam with magnification through a precision gage movement. All parts are plated or otherwise protected against outdoor use. The instrument is said to be unaffected by extreme temperature changes, and it requires no oiling.

For more Details Circle No. 10—Page 297

Hydrometer: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Pencil-size, unbreakable hydrometer for measuring the gravity of

mold or core coating materials is 7¾-in. long and ⅜-in. in diam. Body of the hydrometer is clear plastic. The Baume scale is graduated from 0 to 70 for heavier-than-water mixtures. This hydrometer is useful in the foundry for measuring concentration of siliceous or carbonaceous washes, sprays, dipping or brushing mold or core coating materials. It also may be used for gravity measurements of other heavier-than-water materials such as paints, slurries and liquids containing solids.

For more Details Circle No. 11—Page 297

Cut Wire Shot: Pellets Inc., 277 Military Rd., Buffalo—Cut wire steel shot is made from SAE 1065 hard drawn spring wire of 45-51 Rockwell C hardness. The shot is made by cutting the wire into lengths the same as the wire diameter, and is available in any size—stock sizes include diameters of 0.028, 0.032, 0.035 and 0.041 in. As the shot is used it rounds out into spherical balls said to maintain their weight and working ability for a long time. Use of this type of shot is claimed to reduce blasting equipment maintenance and increase wheel blade life.

For more Details Circle No. 12—Page 297

Clamp Release: Lockrey-Fater Corp., 401 Broadway, New York 13—Semiautomatic action clutch has been applied to "C" clamps and a machinists vise to save time and effort normally expended in running up the clamping screw. A spring-backed finger button acts as a release for the clutch which is normally engaged with the thread of the screw. The clutch cannot be disengaged while

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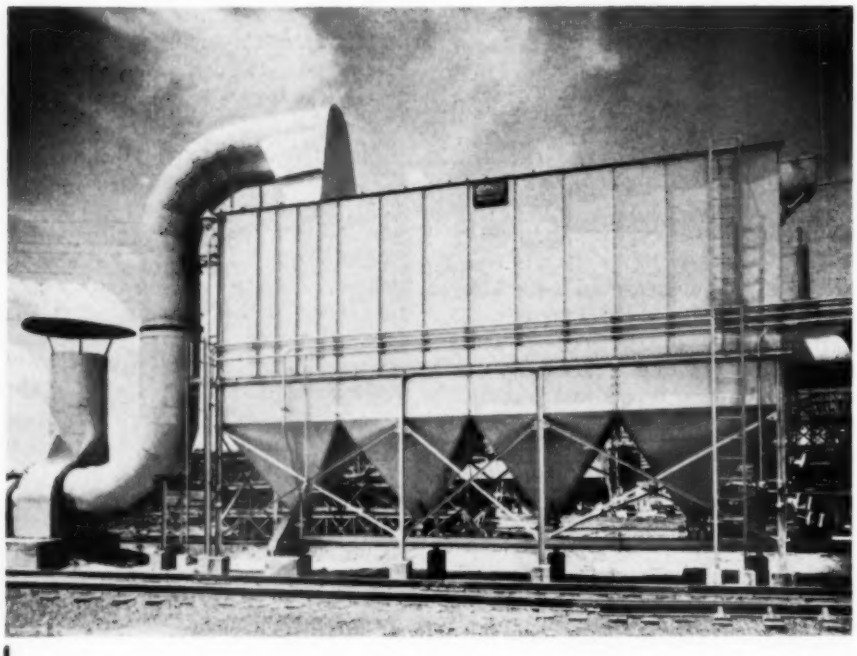

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pressure is on the work. The screw must be backed off slightly before the clutch can be disengaged. The device is incorporated in "C" clamps of 4, 6 and 8-in. sizes and on a machinist's vise which has jaws 3½-in. wide and 1 5/6-in. deep and opens to 4½ in.

For more Details Circle No. 13—Page 297

Hacksaw Blade: Victor Saw Works Inc., Middletown, N. Y.—Shatterproof blade is said to be unbreakable when used in a frame. Cutting qualities of the blade also are claimed to be above average. A number of tests have indicated that the blade will make a greater than average depth of cut in the test

material before dulling. The blade is available in all hand sizes and pitches. It is copper colored and has specifications printed in green on it.

For more Details Circle No. 14—Page 297

Hand Cleanser: Carlton Chemical Co., 33 Commerce St., New York—Industrial hand cleanser is said to work on a new principle of soil removal. It first separates the soil from the skin and then emulsifies it so that it may be wiped off or washed off easily. Complete removal of all types of soil, grease and grime, including printers or duplicating machine ink, carbon, graphite, paint, and stains, except dried enamel, is claimed. The cleanser contains no abrasives, harsh acids or alkali, and is said to leave the skin soft and smooth.

For more Details Circle No. 15—Page 297

Gear Motor: Century Electric Co., Gear Motor Division, 1806 Pine St. Louis 3—New 1½-hp gear motor extends the company's present line from ⅛ to 1½ hp. Larger ratings up to 400 hp are available with gear attachments. The new motor operates on single or polyphase alternating or direct current. A range of speeds

(*Continued on page* 300)

HELPFUL LITERATURE

50. Aluminum Casting Alloys

American Smelting & Refining Co., Federated Metals Div.—40-page illustrated booklet "Aluminum Casting Alloys" is practical guide for foundrymen and contains sections on pouring, shrinkage, dross control, solution treating, aging, stress relief and corrosion. Tabulation of 45 sand, permanent mold and diecasting alloys specifications include nominal compositions and mechanical and industrial properties.

51. Melting Furnaces

Stroman Furnace & Engineering Co.—Illustrated bulletins Nos. 85, 90, 115 and 635 are descriptive of mechanical and hydraulic tilt, stationary crucible, iron pot and reverberatory melting furnaces, respectively. Bulletin No. 135 describes oil burners designed for use with furnace types listed above.

52. Roller Chains & Sprockets

Link-Belt Co.—198-page illustrated data book 1957-A presents complete information on power transmission chains and sprockets; conveyor chains and sprockets; special card flat, Silverlink twist type and balance or leaf chains; Silverstreak silent chain drive; positive infinitely variable speed changer; speed reducers; and roller chain flexible couplings.

53. Conveying Systems

Service Conveyor Co.—4-page illustrated folder explains how company's experience can benefit client in planning foundry conveying systems. Engineers will study problem and submit complete layout to meet particular requirements.

54. Fire Brick

Laclede-Christy Co.—6-page illustrated bulletin No. 202 describes Keystone first quality dry press fire brick and tile for use in boiler settings, open hearth and mill furnaces, glass and lime plants and wherever resistance to high temperature, permanent volume, spalling resistance and load bearing features are essential.

55. Belt Conveyor Idlers

Chain Belt Co.—26-page illustrated bulletin No. 463-R explains selection of correct idlers for various installations and describes Rex roller-bearing belt conveyor idlers, guide idlers, grease pipe extensions, idlers for special applications, and various belt conveyor accessories.

56. Perforated Metals

Diamond Mfg. Co.—24-page illustrated catalog No. 35 lists various perforated metals and perforated metal products for many industrial, ornamental and architectural applications. Such uses include fabrication of devices for cleaning, sizing, separating and refining and for making radiator covers, cabinets and ventilating grilles.

57. Industrial Truck

Baker-Raulang Co., Baker Industrial Truck Div.—4-page illustrated bulletin No. 1311 presents information on type FT 4000-lb capacity fork truck designed to speed materials handling. Features include automotive type controls, foot acceleration, cushion tires, short overall length, one-piece frame and Soft-Touch equalized brakes.

58. Firebrick & Mortar

Mexico Refractories Co.—Series of bulletins, application data sheets and service catalogs describes Helspot plastic firebrick for lining ladles and metallurgical furnaces and Mex-Lox mortar for metal-resistant linings. Former material is usable in ferrous and nonferrous shops where refractory is covered with molten metal or slag. Latter is jointing material for use in laying firebrick in various metal melting operations.

59. Flexible Couplings

Morse Chain Co.—24-page illustrated booklet C41-48 describes how Morflex flexible couplings provide torsional flexibility, isolate vibration, cushion shock and compensate for misalignment. Construction details, engineering data and information on how to order are given also.

60. Flexible Shafts

Wyzenbeek & Staff, Inc.—16-page illustrated catalog No. 50 lists various models of Wyco flexible shafts; grinders; grinding machines; Hy-Speed saws; hole and washer cutters and numerous accessories including drum sanders, rotary files, mounted grinding wheels and carbide cutters.

ADDITIONAL INFORMATION?

For additional information on any of the items described under "New Equipment and Supplies", "Trade Publications" or "Helpful Literature" in this issue — simply circle their corresponding item numbers on one of these cards.

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19	39	59	79	99	119
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THE FOUNDRY 5-50
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61. Gear Motors

Janette Mfg. Co.—4-page illustrated bulletin No. 3-100 describes major features and depicts various types of standard fractional and integral horsepower gear motors available from stock. Basic design of these units centers around worm and combination worm-and-planetary gearing to provide compact low-speed power unit.

62. Hydraulic Lift Gate

Anthony Co. — Illustrated leaflet "New Anthony 'Pick-up' Lift Gate" deals with hydraulically operated unit for attachment to ½ and ¾-ton pick-up trucks. It facilitates one-man handling of packages weighing up to 800 lb.

63. Flat-Surface Grinders

Gardner Machine Co.—50-page illustrated catalog No. 148 contains four publications describing line of flat-surface grinding machinery. Single, double and horizontal disk types are featured and their full specifications listed.

64. Portable Elevating Table

Hamilton Tool Co.—4-page illustrated bulletin No. P-50 describes three standard models of Portelvator portable height-adjustable table or work bench having capacities of 1000, 2000 and 5000 lb. It provides three table surfaces, has four-point support, is self-locking to any height, and has floor lock and antifriction casters.

65. Gas-Electric Power Plant

Ready Power Co.—8-page illustrated bulletin No. 99 depicts numerous applications of compact gas engine generator sets that produce power to operate electric industrial trucks, tractors, cranes and industrial locomotives.

66. Fork Lift Truck

Baker Industrial Truck Div., Baker-Raulang Co.—4-page illustrated bulletin No. 1310 discusses features and points out construction details of type FT-30-48 fork truck having capacity for load weighing 3000 lb and measuring 48 in. long.

67. Proportioning Oil Burner

Hauck Mfg. Co.—24-page illustrated catalog No. 410 deals with proportioning oil burner for accurate control of furnace temperature and atmosphere during heat processing operations. Unit features single control lever and uniformity of oil-air ratios and flame character from all burners on one furnace.

68. Cleaning Mills

N. Ransohoff, Inc.—20-page illustrated foundry equipment catalog "Ransohoff Cleaning Mills" depicts and describes automatic star return, wet method, cleaning mills for castings and sprues. Work is tumbled in large amount of stars which supports work, reaches all parts of castings for thorough cleaning and at same time prevents excessive mill wear.

69. Carbide Files & Cutters

R. G. Haskins Co.—4-page illustrated bulletin No. RF-15 points out features of line of carbide rotary files and ground cutters which are particularly applicable for use in pattern shops. They are highly efficient for finishing castings, metal patterns, dies and molds and performing chamfering, countersinking and deburring operations.

70. Electrical Precipitator

Research Corp.—28-page illustrated brochure "Cottrell Process of Electrical Precipitation" describes gas cleaning equipment for recovering material of value, cleaning air or gases for subsequent use, and prevention of air pollution. Basic types of equipment are described and their use in variety of industries is depicted.

71. Flask Bushings & Pins

Universal Engineering Co.—8-page illustrated catalog F1016 and attached price list cover precision machined, hardened and ground flask pins and bushings for use in cast iron, steel or aluminum flasks. Having stability and accuracy to provide register of cope and drag for hundreds of castings, units are available in several sizes of round, elongated, press fit and other standard types.

72. Warm Air Space Heaters

Dravo Corp. — 6-page illustrated folder No. 520 explains features of Counterflo heaters which make it especially useful for tempering make-up air in foundries and metalworking shops. Units are available in capacities up to 22,000 cfm, are effective with or without ducts, burn oil or gas and are readily converted from one fuel to other.

73. Motor Control

Allen-Bradley Co.—76-page illustrated "Handy Catalog," fourth edition, lists various accessories and components for motor control including manual and magnetic across-the-line starting switches, reduced voltage starters, control relays, synchronous starters, high voltage starters and similar equipment for direct current motor control.

74. Vibratory Feeders

Syntron Co. — 16-page illustrated folder "Vibratory Feeders" describes Vibra-Flow equipment with variable control of rate of flow available with overhead driving, dual driving or dustproof enclosed magnets and infrared heat lamps. Equipment is usable as long conveyors or as wide, spreader, water cooled and heated or furnace feeders.

75. Roller Conveyors

Standard Conveyor Co.—12-page illustrated bulletin No. 67 depicts gravity and power operated roller conveyors handling flat sheet steel; moving coils of steel and transporting materials in brass mills, airplane parts plants, foundries and other plants. Pneumatic tube service is discussed and illustrated also.

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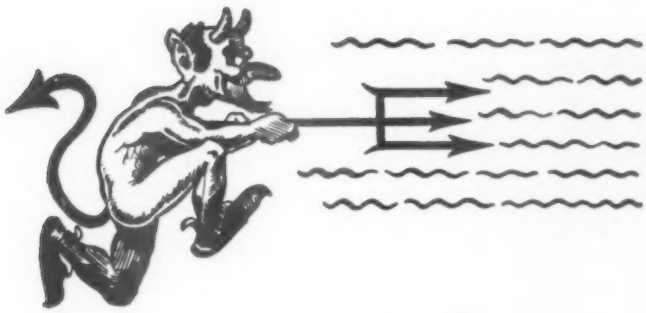


Soffel's

THERMOTOMIC PROCESS

(Patented)

and

CARBON FREE LIQUIDIZER

For

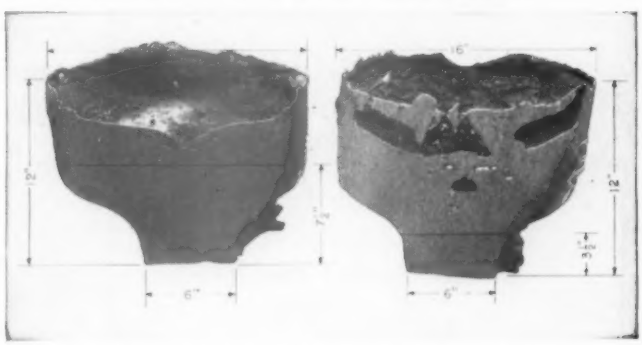
STEEL • IRON • ALUMINUM BRASS • BRONZE • COPPER

Keeps metal molten!

300 lb. aluminum bronze bearing cap cast with THERMOTOMIC feeding ring core under riser. Note small feeder opening which facilitates removal of riser from casting, resulting in greatly reduced cleaning costs.

THERMOTOMIC is a patented Exothermic compound that can be molded into any desired shapes and used as feeding inserts under risers or as facing application where it is desired to maintain fluidity of the casting metal. THERMOTOMIC permits reversal of the trend towards large feeding heads and risers, making it possible to use heads that are shorter and more compact with very small feeder openings. This permits easy removal of heads and gates and sharp reductions in cleaning and finishing costs. When THERMOTOMIC is used as inserts or as facing in the mold, heat at thin metal sections is retained until the main body of the casting has solidified, thus eliminating shrink cracks and improving grain structure and tensile strength.

SOFFEL'S CARBON FREE LIQUIDIZER PRODUCES GREATER YIELD



Steel Riser on left contains twice as much sound metal

These risers, made in the same mold, illustrate how Soffel's Carbon Free Liquidizer produces sounder castings and saves metal. The riser on the left, on which Carbon Free Liquidizer was used, contains more than twice as much sound metal as the riser on the right on which a common carbonaceous pipe eliminator was used. It is readily seen from this that the use of Soffel's Carbon Free Liquidizer permits substantial reductions in size of risers.

Thermotomic ABC for Aluminum and Magnesium Castings

THERMOTOMIC ABC is the first successful exothermic feeding compound ever to be developed for aluminum and magnesium castings. Results obtained from its use are amazing. Feeding metal in heads or risers is maintained in the fluid state for 20 to 30 minutes. Great savings are effected through reduced riser dimensions. Feeding heads or risers are reduced in volume 80% and more, and their removal from the casting is greatly facilitated due to the restricted feeding necks.

An Exothermic Feeding Head Compound and Pipe Eliminator For Aluminum and Magnesium Castings

SOFFEL'S AL-X31 LIQUIDIZER was developed for use in conjunction with THERMOTOMIC ABC. In order to secure best results and maximum feeding, we strongly recommend that AL-X31 LIQUIDIZER be applied on the feeding heads or risers. When so applied, AL-X31 LIQUIDIZER enters into an intense exothermic action which will actually raise the temperature of the feeding metal. The heat produced is sufficiently great that, even if the metal has solidified, it will re-melt. After AL-X31 LIQUIDIZER has completed its exothermic action, it forms a soft, insulating cover on the feeding metal. This cover confines the heat generated and further delays solidification of the feeding heads or risers.

BEWARE OF IMITATIONS: We are the originators of Carbon Free Liquidizer.

PITTSBURGH METALS PURIFYING COMPANY

Manufacturers of Quality "Fluxes for all Metals and Alloys"

1352 Marvista Street **Pittsburgh 12, Pa.**

CHECK YOUR Crucible costs over the past 10 years and you will probably find that while prices generally have gone up 50% Crucible life has increased 60% or more.

As one foundryman puts it, "Crucibles are about the only thing you buy these days that in actual value costs less compared to pre-war days; you get 60% more heats while the dollar cost has on the average risen only 50%."

No other type of non-ferrous melting equipment can show a comparable saving to the foundryman.

Enjoy these savings together with all the other established benefits of Crucible melting.

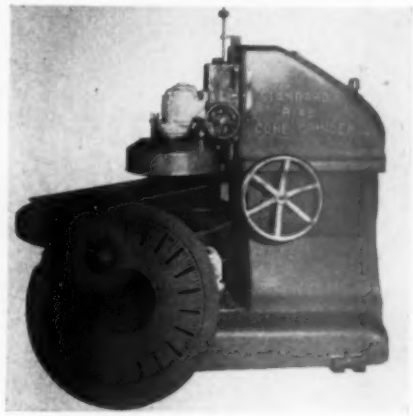
Write for Crucible
Melters' Handbook

(*Continued from page* 296)

from 25 to 280 rpm may be obtained. The new motor employs worm type gears and has only four bearings—two ball and two roller.

For more Details Circle No. 16—Page 297

Core Grinder: Standard Pattern Works, 6771 East McNichols Rd., Detroit 12—Core grinder has a 48-in.-diam table mounted on pre-



cision roller bearings, and is designed for fast, accurate core grinding. Bearings are completely enclosed, protected against dust. Table rotation can be controlled either manually or by an adjustable speed reducer, which can be located below the table. A ¾-hp motor mounted on a counterbalanced sliding head furnishes direct power to the grinding wheel, which is adjustable to any vertical setting. Wheels are said to be quickly and easily changed. A 1-hp motor is used with the speed reducer.

For more Details Circle No. 17—Page 297

Hammer: Mondie Forge Co., 10274 Berea Rd., Cleveland 2—All-purpose mechanic's hammer has one head of drop forged steel and the other of rubber, which is useful in light or heavy work where surfaces of material must not be dented or damaged. The medium-hard rubber head is pressure-locked on a drop forged steel base and has a calculated low blow-recoil factor. It can do heavy work without denting or peining the material being struck, it is claimed. The metal head is drop forged steel. Hammers are available at present in the 40-oz size only.

For more Details Circle No. 18—Page 297

Gypsum Cement: Certainteed Products Corp., 120 East Lancaster Ave., Ardmore, Pa.—Gypsum cement requiring a minimum of mixing water, has been developed for making plaster casts having compressive strengths of 10,000 to 15,000 psi. The material is said to mix and

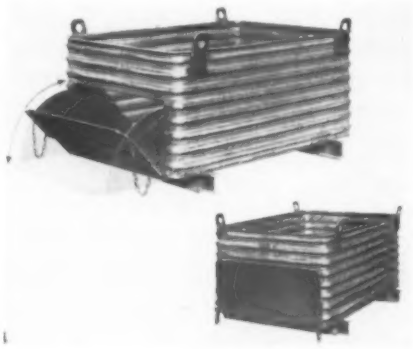
handle like ordinary gypsum cements, and to require no special equipment for successful shop use. It has been used for the production of case molds, block molds, foundry patterns, models, dies for pressing plastics, metal casting investments, floor patching compositions, and other applications. The material is available in two grades, "Industrial" and "Low Expansion." The latter material is suited especially for applications requiring casts having a high degree of dimensional stability.

For more Details Circle No. 19—Page 297

Paint: Speco Inc., 7308 Associate Ave., Cleveland 9—A clear, antirust paint has been formulated for brushing or spraying directly over rust without wire brushing or scraping. Any good quality paint, except lacquer, can be applied over the antirust paint. It is said not to bleed through painted surfaces. Consequently, it is suitable for use as a rust-proofing primer and undercoater.

For more Details Circle No. 20—Page 297

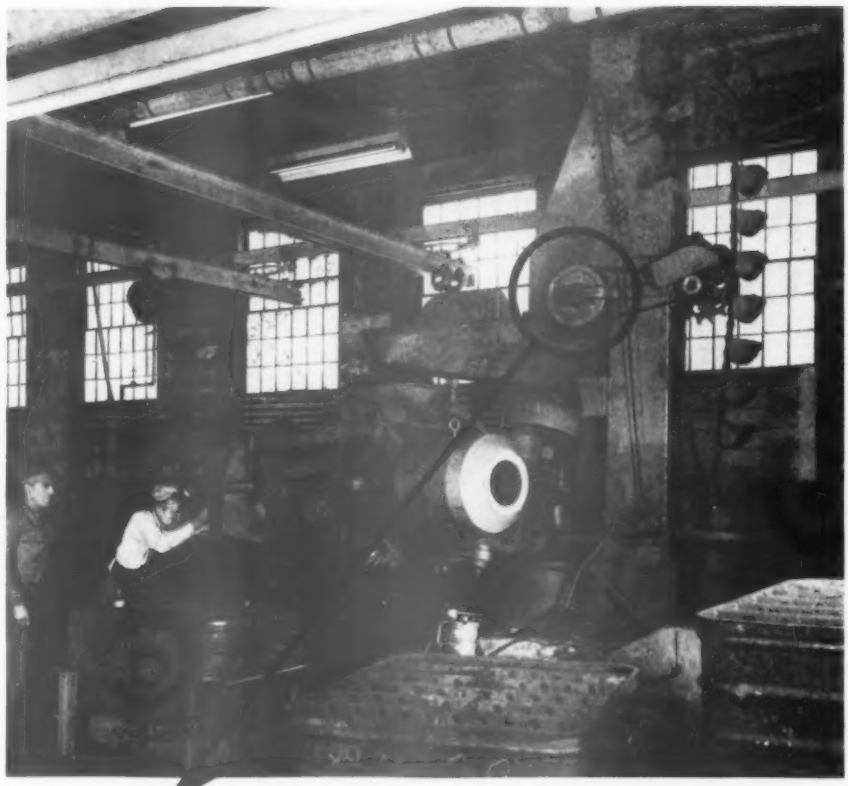
Stacking Box: Palmer - Shile Co., 16033 Fullerton Ave., Detroit 27—Corrugated steel stacking box has a chain-operated hinged door. One of the convenient uses of the box is on a steel stand. The door may be opened to any set angle to facilitate parts disposal by standing or sitting workmen. Door also eliminates the necessity of removing tiered boxes when it is desired to dispose of parts in boxes not at the top. Boxes are

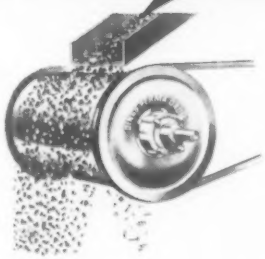


built to specified dimensions and load capacity. Crane lugs, stacking brackets and color of paint desired also may be specified.

For more Details Circle No. 21—Page 297

Packaging Tape: Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6—High strength tape has an acetate film backing and glass filaments imbedded in a resilient, shock-proof rubber adhesive. It is said to provide 500 lb of tensile strength per inch of width and to have good shock and tear resistance.





To Cut Your IRON REMOVAL COSTS Use the New DINGS Non-Electric PERMA-DRUM

Reg. U.S. Pat. Office

Non-magnetic material flows over the revolving drum shell in normal trajectory. Magnetic materials are held fast to drum until carried beyond magnetic field, at which point they are separately discharged.

★

Magnetic strength certified.

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Magnetic permanence *guaranteed* for the life of the unit!

★

For modern magnetic separation it's Dings—Perma-Drums, Perma-Pulleys, Perma-Plates plus a complete line of electro-magnets.

HERE IS powerful, trouble-free automatic removal of iron from molding sand. Unit pictured is installed in a Sandslinger.

A new Dings Perma-Drum with armor plate abrasion-resisting steel shell and powerful, permanent, self-energized magnet assembly will give you years of trouble-free, low cost separation. Eliminates electrical magnet maintenance—and more powerful than the old electro-magnetic drums. Fully described in CATALOG C-1100A—write for your copy today.

DINGS MAGNETIC SEPARATOR CO.
4708 W. Electric Ave., Milwaukee 14, Wis.

Dings MAGNETIC SEPARATION HIGH INTENSITY Reg. U.S. Pat. Off.

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The New National Crucible

Increased Service Life

Increased Capacity

for all Non-Ferrous Melting

See this new crucible at Booth No. 408
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Mr. Charles R. Hilb
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Snyder Foundry Supply Co.
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Pacific Graphite Co., Inc.
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FOR SOUND CASTINGS

CAPEWELL FOUNDRY CHILL NAILS

For the most satisfactory results in casting manufacture, use Capewell Foundry Chill Nails. Because they are made of the finest quality soft iron they fuse quickly into the casting. In the Capewell line you will find a foundry nail for every purpose and size of casting. Sharp points or blunt ends... regular, slim, or extra slim blades. Send for samples. No obligation. Simply write to . . .

THE CAPEWELL MFG. CO., • DEPT. 45 • HARTFORD 2, CONN.

CAPEWELL HACK AND BAND SAW BLADES

CUT TIME • CUT COSTS

For sawing risers and gates, for trimming castings, order Capewell Hack and Band Saw Blades. Capewell's advanced heat-treating produces faster-cutting and longer-lasting blades.

1881 CAPEWELL

THE KEY TO ECONOMY

It can be used for banding bundles of steel pipes, tubes and coils for shipment. It is applied by hand wrapping around a load and back on itself. It sticks immediately on contact. The tape is made in 72-yd lengths and standard widths of ½, ¾ and 1-in. with other widths made on special order. It will be available in transparent, black, white, red and blue.

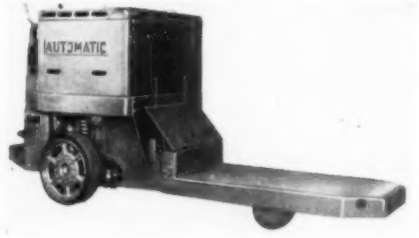
For more Details Circle No. 22—Page 297

Indicating Pyrometers: Assembly Products Inc., Main at Bell St., Chagrin Falls, O.—Three sizes

of precision pyrometers for panel mounting have unbreakable, clear plastic, one-piece front covers. Eight ranges cover temperatures from minus 75° F to 3000° F with corresponding ranges shown of minus 60° C to 1600° C. The instruments are easily adapted to various lengths of thermocouples from a few inches up to 100 ft or more. Movements are designed for rugged industrial service with oversize moving coils.

For more Details Circle No. 23—Page 297

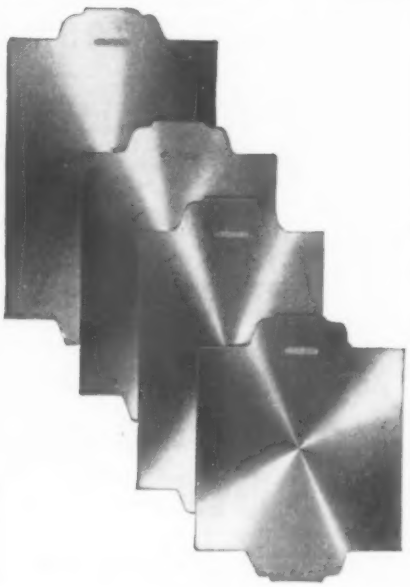
Hydraulic Lift Truck: Automatic Transportation Co., 149 West 87th St., Chicago—The company's 6000 lb low-lift platform truck has been equipped with hydraulic lift, which provides full control in lifting and lowering—an important feature when handling green cores. Replacing chains and gearing by a hydraulic pump and ram reduces the number of parts to maintain. Re-



lief valves in the hydraulic circuit are said to give positive overload protection, reducing wear and prolonging the life of the equipment.

For more Details Circle No. 24—Page 297

Blowers: North American Mfg. Co., 4455 East 71st St., Cleveland 5—Seven new sizes of blowers of the large-volume, low-pressure type have been added to the company's line.



Cast Aluminum MACHINED PATTERN PLATES

Shipped promptly from the World's Largest Stock

All standard flask sizes are carried in stock. All plates are cast with one inch flask margin all around PLUS large, well shaped ears for flask pins and vibrator. Order by flask size, not plate size. It will pay you to investigate this source for quality plates.

PRICES UNCHANGED SINCE 1944

Below are some typical prices

For 3/8" Plates, Add 33 1/3% For 1/2"

10 x 16	$8.25	12 x 18	$9.90
10 x 18	8.80	13 x 16	9.65
11 x 16	8.55	14 x 14	9.35
11 x 18	9.35	14 x 16	10.15
12 x 14	8.55	14 x 18	12.10
12 x 16	9.05	16 x 16	12.10

SEND FOR PRICE LIST TODAY

Special Shapes and Thicknesses to Order

ARTHUR E. WILL
643 West 11th Street
ERIE, PA.

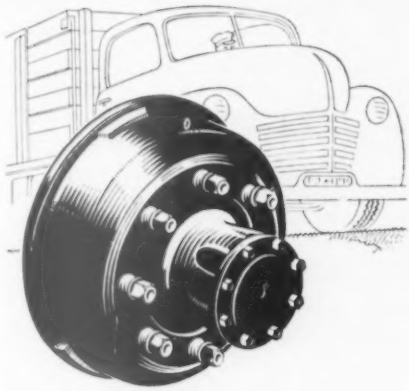
They come in either single or two-stage units, and may be obtained in a directly connected style or with V-belts transmitting power from motor to the blower impellers through a jackshaft. Four-ounce blowers give 4000 and 4700 cfm with 7½ and 10-hp, 1750-rpm motors, respectively. Eight-ounce blowers give 2480, 4250 and 4800 cfm with 10, 15 and 20-hp, 1750-rpm motors. Two blowers with 50 and 60-hp. 3600-rpm motors give 6000 and 7560 cfm, respectively. Cases and bases are of fabricated steel plate and balanced impellers are of fabricated aluminum. The discharge may be ordered in any one of several positions.

For more Details Circle No. 25—Page 297

Eyeglass Tissues: Dow Corning Corp., Midland, Mich.—Eyeglass and goggle cleansing tissues are impregnated with a special silicone intended to give added clarity and luster to glass. This silicone also forms an invisible coating that protects the surface and prevents the adherence of most organic materials. No fluid is required. A tissue dispenser is available for plant and office use. It holds a normal month's supply of 3 x 7 in. tissues.

For more Details Circle No. 26—Page 297

Polisher: Precision Scientific Co., 3737 West Cortland St., Chicago 47—Laboratory tool for electrolytic polishing of metals for microscopic examination is designed for use with carbon steels, alloy steels, copper, brass and other metals. The electrolytic polisher consists of two units—the electrolyte bath and the rectifier assembly. The bath is made up of a glass jar placed inside a stainless steel insulated jacket. Space between jar and jacket allows flow of cooling water around the jar to keep electrolytes below critical temperatures. The rectifier assembly is equipped to convert alternating current to direct



Wear- and heat-resistance —together

The addition of Molybdenum to cast iron has specially applicable effects where good resistance to wear must be combined with least susceptibility to cracking under sudden changes of temperature.

Brake drums, for instance: here is a well-proved composition, 3.70% Total Carbon, 1.80% Silicon, 0.80% Manganese, with 0.50% Chromium and 0.70% Molybdenum added.

This is one of the many suitable economical compositions in our new booklet, "Applications of Molybdenum Cast Irons." The busy foundryman and engineer will find the alphabetical listing useful—write for a copy!

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MOLY

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HERE'S LOW-COST POSITIVE TEMPERATURE CONTROL...

with *Alnor* ACCURACY

Alnor Temperature Controller

Now—at a cost far less than you may think—you can bring automatic, precise temperature control to heat-treating furnaces, bake-ovens, etc.—in fact, to any heating device whether electrically heated or fuel fired. The Alnor Controller is simple in design and operation—you merely set the pointer at the desired cut-off temperature, and it's ready to give you the finest in accurate controller service on new or existing heating equipment. Alnor quality throughout, it features the famous double air gap pyrometer movement; easily read, 6-inch mirrored scale; automatic cold-end compensator; weather-proof, dust-tight case—a truly rugged, precise instrument at a price you can afford. Write today for complete information and price.
Illinois Testing Laboratories, Inc., Room 523, 511 N. LaSalle St., Chicago 10, Illinois.

Alnor

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

current of proper voltage and amperage. All necessary controls are supplied. Unit operates on 115v, 60c, 450w current.

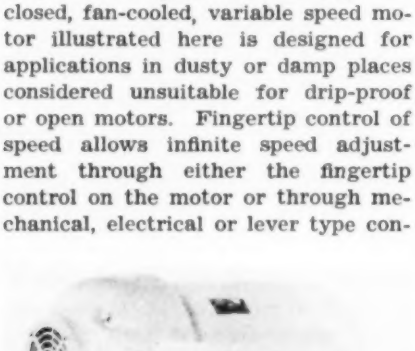
For more Details Circle No. 27—Page 297

Power Wheelbarrow: Kwik-Mix Co., 126 Milwaukee St., Port Washington, Wis.—A large steering wheel has replaced the lever bar ar-

rangement formerly used for guiding the power wheelbarrow. Steering gear ratio has been increased from 2:1 to 4:1. The unit has a rated hopper capacity of 10 cu ft, or 1200 lb on the platform body. It is powered by a standard 4-hp gasoline engine and travels at speeds of 1½ to 4 mph, both forward and reverse.

For more Details Circle No. 28—Page 297

Motors: Sterling Electric Motors Inc., 5401 Anaheim-Telegraph Rd., Los Angeles 22—Totally enclosed, fan-cooled, variable speed motor illustrated here is designed for applications in dusty or damp places considered unsuitable for drip-proof or open motors. Fingertip control of speed allows infinite speed adjustment through either the fingertip control on the motor or through mechanical, electrical or lever type con-



trols. The motor is built with pulleys, shafts, and belts in one compact unit for ease of installation. The company also is producing an improved line of gear-head, slow-speed electric motors. Feature of this new design is that the motor can be mounted in any position. It

1858 ★ ★ ★ 1950

92

YEARS

of Competent Lumber Service to Industry

but-

specializing in lumber for the pattern shop and the foundry

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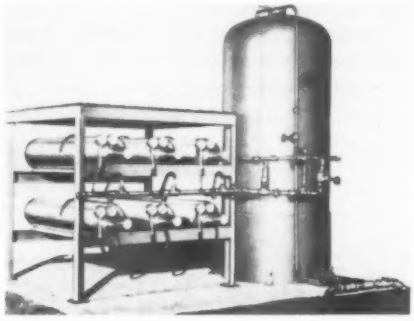
also features weatherproof design, higher efficiency due to an integrally built unit with helical gears, herringbone rotor, ball bearings, compact design through the use of offset shafts, and positive lubrication.

For more Details Circle No. 29—Page 297

Fire Protection: Ansul Chemical Co., Marinette, Wis.—Dry chemical stationary fire fighting units are being built in 500, 1000 and 2000 lb capacities. They are designed to protect wide areas where a minimum of manpower is available. Unit consists of a centrally located steel tank containing dry chemical and nitrogen cylinders (used to pressurize the tank). Piping runs underground from the tank to one or more hose houses where 1-in. chemical engine hose is coiled. Hose may be obtained in 50, 100 and 150-ft lengths. Rate of flow of dry chemical is 450 lb per minute.



Recoil has been minimized by a specially designed nozzle. Effective range is about 35 ft.

For more Details Circle No. 30—Page 297

Resin Binder: Union Carbide & Carbon Corp., Bakelite Division, 122 East 42 St., New York 17—Resin binder for producing cores and molds from sand has been developed for use in the Croning process (described in THE FOUNDRY, October, 1948, p. 130) for casting metals. The new resin differs from those used for sand core bonding in the past, in that it does not require long baking and curing and uses relatively small volumes of sand. In use the pulverized resin is blended with fine sand and the mixture applied to a hot metal pattern which forms a half mold. The resin melts, forming a continuous coating over the pattern. Excess resin-sand mixture that is not melted is removed by inverting the pattern. The pattern with the adhering coating is placed in the oven for 1 to 2 minutes for further hardening before removing the pattern. Cores are made similarly except that the resin-sand mixture is blown into a hot split metal corebox.

For more Details Circle No. 31—Page 297

How Kelsey-Hayes cut belting costs $900 in 8 months

Job-Designed for Hot Materials

Made of 37½-ounce tight-woven silver duck combined with asbestos and special insulating material and then impregnated, Imperial's Super-Insulated Sahara handles materials from 450° to 600° F.

Write for Data Sheet 47-8 and prices.

■ Kelsey-Hayes Wheel Co., Detroit, installed an 85-foot belt conveyor under three shakeouts to handle 200-degree sand and **red hot** scrap.

In 8 months, K-H burned up two rubber belts. Initial cost was $1,600 each. Shutdowns were frequent, operating costs excessive. Every time a piece of red hot scrap fell on the belt, it burned a hole that had to be patched immediately.

Installed at a cost of $2300, Imperial's SUPER-INSULATED SAHARA belting lasted 8 months and 8 days on the same conveyor. Saving in initial cost was $900 for the 8-month period. Maintenance costs were nil: not one piece of red hot scrap burned through the Imperial belt.

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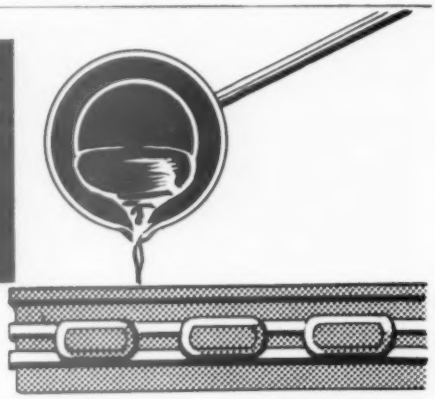

When cores are vented with . . .

Buffalo Brand VENT WAX

Dependable, time-proven Buffalo Brand Vent Wax. Choice of leading foundries for forty years for fast, safe core venting. Put it to work for you and watch that scrap pile disappear.

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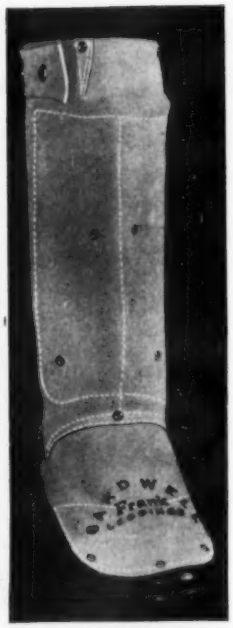

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STANDARD HORSE NAIL CORP.
Since 1872 NEW BRIGHTON, PA.

PATTERN SHOP

(*Continued from page* 133)

before the pattern equipment is planned or estimated.

Having this information, the foundry should expect the pattern shop to consult it and should specify—or they should jointly agree upon—the type of pattern best suited to the foundry's equipment and facilities for the quantity required. There are usually alternative setups for any particular pattern or corebox, and if there is a time-study or industrial engineering department involved, it might be called upon to estimate the cost of the quantity of castings to be made, by two or more different molding or coremaking procedures.

By applying the estimated direct labor of the various methods, and taking into consideration the various departmental burdens—if different departments are involved—the most economical foundry routing can be determined. This can be balanced against the cost of the pattern equipment necessary for each, the ultimate consideration, of course, being the cost and quality of the castings of the specified quantity to be produced.

Estimate The Cost

If there is no time-study department, the foundry foremen involved can estimate the production to be obtained by the various methods and arrive at a reasonably accurate cost estimate of each. This often brings to light the fact that a few additional dollars expended for pattern equipment often results in lower ultimate casting cost, generally better foundry production and castings of better quality and uniformity, both externally and internally.

When the problem is attacked in this manner the most hard-boiled purchasing agent, plant manager, or customer can be sold on the higher cost of the original pattern equipment.

The following should then be determined and recorded, preferably on the pattern blueprint.

It should be determined whether the pattern and coreboxes should be of pine, mahogany, aluminum, magnesium, cast iron, brass, plastic or other material. If it is determined that a white pine pattern will suffice for the production required, it might be decided that certain lugs, ears, loose pieces, thin flanges, etc., should be made of mahogany or even metal. The small increased cost is often saved many times in pattern maintenance costs and in uninterrupted and increased foundry production.

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YOU can be *sure* of quality patterns, when you buy Well-Made wood or metal patterns.

It's easy to say our facilities are the best but we would rather prove it to you. 40 years' experience. A well-equipped, modern shop.

These are plus factors that have helped us demonstrate our ability to countless outside foundries and other industries.

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The type of equipment should next be decided, whether the pattern should be single loose, split loose, matchboard, matchplate or cope and drag boards. The single loose pattern usually is not desirable nor economical unless it is a flat-back pattern or at least has a straight parting.

If the design is such that a split pattern is impractical and the quantity involved warrants only a loose pattern, then a follow block or follow board often pays for itself many times when the parting is irregular and would have to be cut in the foundry. It should also be kept in mind that where a matchboard or matchplate is considered warranted, a cast plate of multiple patterns may cost less than individually mounted wood patterns since only one master is required for the casting of a matchplate.

Decide on Mounted Pattern

If a mounted pattern is decided upon, the size of flask, pin centers, number of patterns per board or plate and the amount of space required for gating and heading should be taken into consideration. If the pattern is liable to be moved from one foundry to another, it might be advisable to make the plate or boards to accommodate one size larger flask which might be standard in one foundry and not in another.

It should be determined whether the casting is to be made in green or dry sand so the patternmaker can figure his shrinkage allowance accordingly.

Cores should be marked as such, and core prints and the parting line of pattern and cores properly outlined. If core surfaces require grinding, this and the allowance for core grinding should be noted.

If loose pieces or driers are involved, these and drying surfaces should be noted where possible or necessary.

If core rubbing fixtures, core setting gages or core setting fixtures are required, how these are to be used, how the cores are to be rubbed or ground, and how they are to be assembled and placed in the mold should be noted.

If cores are to be blown, the height of coreboxes that will fit under the blowing machine and/or the method of attaching to the blowplate should be taken in consideration.

Where the gating, heading, etc., is to be done by the pattern shop making the pattern, the size and location of gates and risers, and the size, type and location of chills and vents to be provided should be determined and noted.

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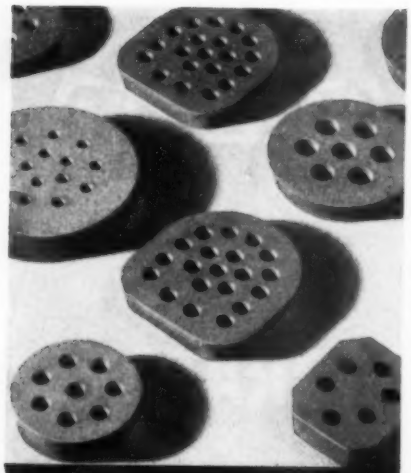

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A Detroit foundry saves thousands of dollars each year on cylinder head castings weighing about 125 pounds. Another foundry, after long experience, states, "In all cases a definite improvement was noted if the molding procedure included the use of AlSiMag Strainer Cores." Improved quality, fewer rejects, have added materially to their profits.

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Samples of AlSiMag Strainer Cores from sizes in stock are sent free on request. Test samples made to your specifications at reasonable cost. Write for samples. Test them in your own foundry. Keep a record of the results. You will see, as other foundries have, that AlSiMag Strainer Cores pay for themselves many times over.

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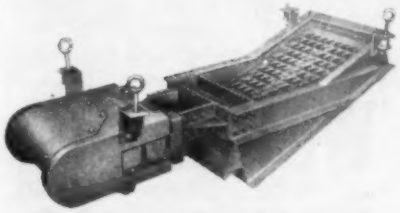
After this necessary planning has been done co-operatively by the pattern shop and the foundry departments involved, the pattern shop then, and only then, is in a position to proceed with the making of the pattern.

In addition to furnishing patterns which are dimensionally correct, the foundry has the right to expect the pattern shop to observe and incorporate into the pattern certain principles of good patternmaking which, though seemingly fundamental, are sometimes overlooked or neglected even by supposedly experienced patternmakers.

A few of these points are:

1. Abrupt changes in section or extremely thin sections should be checked with the engineer and changed if at all possible.
2. Unnecessarily heavy lugs or bosses in locations impossible to feed should be checked and reduced as much as possible.
3. Fillets which are specified and which are not sufficient to avoid shrinkage should be questioned and changed. If not specified, they should be provided of ample proportions.
4. Loose pieces should be eliminated wherever possible. This is often possible by running pads or bosses to the parting line.
5. If loose pieces are necessary in either the corebox or pattern, they should be plainly marked so that molding and coremaking time is kept to a minimum in placing them; also so that they may be readily identified in the pattern storage.
6. When dowels are used for locating loose pieces or matching pattern-halves, or corebox halves, they should be so placed that the pieces cannot be reversed or wrongly placed. Preferably two different sized dowels should be used to prevent this.
7. Where loose pieces are necessary and can be dovetailed, this is preferable, and properly fitting dovetails should be provided to allow the proper free movement and drawing of the loose piece, together with proper markers or tell-tales to insure the correct locating of the loose pieces.
8. Likewise, coreboxes and core prints should be designed with proper markers so that it is impossible to reverse or set cores wrongly.
9. Core prints should be of ample size and properly placed to obtain good core balance when the core is set in the mold.
10. Where a large core must necessarily be overbalanced somewhat, a shoulder with sufficient sand between it and the casting wall should be provided to prevent the core from tilting because of its overbalance.
11. Sufficient taper and clearance on core prints should be provided to allow the cores to be set without shaving or crushing sand.
12. On the drag prints of large cores a bead at the edge of the print should be provided to catch any sand which might be shaved in setting and which would otherwise prevent the core from seating properly.
13. When possible, cores may be allowed to "kiss through" on the cope side to prevent the shaving of cope core prints when closing the mold. This can be done if the core can be properly balanced and securely located in the drag.
14. When the body of the core is necessarily larger than the drag print and a "blind set" is unavoidable, much greater than normal taper and sufficient length of print should be used so that sand cannot be crushed or shaved by the blind set.
15. Ample draft should always be provided and where certain dimensions are marked to be held, draft should be provided from these points.
16. Where either insufficient core support, lack of means of removing core wires or rods, or in some cases lack of means of properly venting large cores exists, cored holes may necessarily have to be provided, these to be plugged in the casting if necessary.
17. In certain coreboxes where the print is not the face of the box, means of venting by vent plugs or by holes for vent rods through the sides of the box should be provided.
18. In large cylindrical patterns, or in light casting sections surrounding massive cores, the difference in linear shrinkage should be taken into consideration.
19. In large patterns the side boards should always be run to the bottom of the pattern so that any swelling of the bottom boards will not prevent a good draw.
20. In large patterns proper reinforcing to prevent distortion of the pattern during drawing should be provided.
21. In large patterns draw straps should be run to the bottom of the pattern and pre-

SYNTRON



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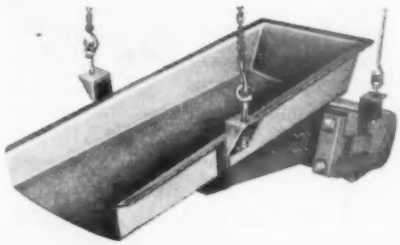

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ferably hooked under the bottom, if possible, to insure that the full load of drawing the pattern is from the bottom.

22. Sufficient rapping and draw plates, properly supported, should be provided so that the pattern is not damaged by rapping and draw spikes.

23. When properly advised by the foundry of the location and size of heads and gates, the location, size and type of chills and location and size of vents, the pattern equipment should be marked with this information unless a separate record of such information is maintained on a job history or routing card.

24. A durable, moisture resistant, nonsticking coating should be applied to all wood patterns and coreboxes.

New Safety Films Are Offered

National Safety Council, 20 North Wacker Dr., Chicago 6, has developed a new training aid in the form of a quiz on film. Entitled "What's Your Safety IQ?" the film shows common, unsafe, off-the-job actions and conditions that can cause accidents in the home, in traffic and in recreation. As each set of hazards is shown, viewers are asked "What's wrong with this picture?" and are given 12 to 15 seconds to spot safety errors. Then the narrator points out hazards and tells what could be done to remove or avoid them.

Also available is a film entitled "Easy on the Eyes." It presents an emotional appeal for workers to realize what their eyes mean to them, then shows how easily eyesight may be lost.

The films are available in 35-mm sound slidefilm and a new type of 16-mm sound film which is a combination of motion pictures and still photos. Prices for purchase, preview or rental may be obtained from the council.

Book Review

Alloy Steels, Cast Iron and Nonferrous Metals, by F. Johnson, cloth, 5½ x 8¾ in., published by the Chemical Publishing Co., Brooklyn, Price $5.

The author is head of the department of metallurgy, Central Technical College, Birmingham, England, and the material has been prepared for use as a text by engineering students. Considerable of the text is devoted to various phases of rolled steel, including production processes, types of alloy steels, high-speed steels and applications of heat treated steel.

One chapter is devoted to heat treatment of cast iron. Brief information is given on composition, structure and heat treatment of cast irons, Meehanite, special duty cast irons, austenitic cast irons, martensitic cast irons, malleable cast iron, etc.

The work has been reproduced from an English text by the offset process which is not too satisfactory in reproducing micrographs.

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Navy Modernizes Foundries

(*Continued from page* 141)

is attached to the adjacent sand conditioning unit. Sand from the shakeout unit drops through the screen into the boot of a vertical bucket elevator and is lifted to a short cross-conveyor belt. The latter discharges the sand into an elevated 50-ton storage hopper, or bin. From the bin 2000-lb batches are discharged below into a sand muller where moisture, additional bond, etc., if required, are added. Sand from the muller is discharged into a bucket elevator and lifted to a transverse conveyor belt for distribution to either of two 200-ft-long conveyor belts extending along each side of the molding department. These belts extend over the tops of the storage hoppers at the molding stations in the machine and floor molding departments.

Use Albany Sand

Molding sand in general use in the foundry for copper-base and aluminum-base alloy castings is No. 1 Albany with a grain fineness number of 110 to 130, and contains 12 to 15 per cent clay. Moisture content runs about 6 per cent, permeability about 15, and green compressive strength about 8 psi. When required for heavy castings, more open types of sand for backing sand are available.

Core department is at one end of the 53-ft bay. Small and medium size cores are made on the bench and on core blowing machines. Department is equipped with 16 benches arranged in two rows, and two core blowing machines. Large cores are made on the floor. Two types of sand are used for making the cores. One is a coarse type of 40 to 50 grain size for large cores. The other is a medium sand with a fineness of 110 to 120. Large cores are faced with the same sand to obtain the desired surface finish. The cores are baked in gas-fired shelf or room type ovens depending upon the size.

Cleaning and finishing department, as previously indicated, is located in a separate building across from foundry. Also constructed of brick and steel sash, it is about 30 ft wide and 200 ft long. A narrow-gage track connects the cleaning department and the foundry, and castings are transported between the buildings on a small car. The first operation performed on the castings is wet abrasive blasting conducted in a 16 x

20-ft unit located in one end of the building.

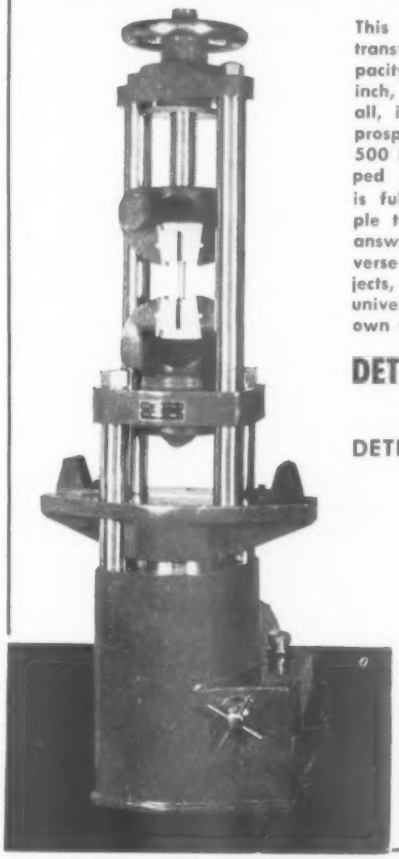
Following this operation, the gates and risers are removed on any of several machines available for the purpose. These include three band saws, an abrasive saw using a thin disk, and two heavy type steel circular saws — one with the saw mounted to cut in the vertical plane, and the other arranged to saw in the horizontal plane. Circular saws are about 24 in. in diam, and mainly are used to remove heavy gates and risers. Other equipment is employed in cutting off light and medium section gates and risers.

After the gates and risers are removed the castings are subjected to chipping, grinding and filing operations as required. Smaller castings are ground on two double-wheel stand grinders, while the larger and heavier castings are ground with air-driven portable grinders. Chipping is done with pneumatic equipment. Cleaning department also houses a welding department for salvaging certain types of castings where such operations are permissible. Following the various cleaning and finishing operations, the castings are inspected carefully to see that they meet requirements and then they are placed in the shipping department for distribution to other departments where they are utilized singly or in assemblies.

Operate Special Unit

Earlier in this description of the nonferrous foundry of the Naval Gun Factory, mention was made of a special molding unit located in the 37-ft bay. It was designed and constructed by the Gun Factory for production of gray iron 3-lb practice aerial bombs. As indicated in Fig. 1 the unit consists of a cope and drag unit comprised of two jolt rollover molding machines. Molds from the drag machine are placed on a gravity roller conveyor about 55 ft long. Cope molds are placed on a short length of roller conveyor, and then shifted by a hoist to the drag mold and closed upon it. At the end of the 55-ft conveyor run, the molds make a 90° turn to a parallel roller conveyor along which they are pushed by a pneumatically-operated ram. The molds are poured near that end of the conveyor and then pushed about 100 ft where they are lifted off by a hoist and set on a short length of roller conveyor at a right angle to the other. This carries the mold to a vibrating shakeout unit. Flasks are returned to the molding machines on a roller conveyor. The castings are placed in tote boxes, and the sand discharged into a muller. After conditioning, the sand is transported on

UNIVERSAL TESTING MACHINE



This is a very practical machine for tensile, transverse and compression testing. Its capacity, equivalent to 150,000 lbs. per square inch, on a standard .505 specimen. Best of all, it is priced within reach of the average prospective user. It weighs approximately 500 lbs., stands 4 feet 4 inches, comes equipped with gauges, grips, blocks and motor, is fully automatic, and is exceptionally simple to operate. If you want quick, accurate answers to questions concerning tensile, transverse and compression qualities of metal objects, just invest in this compact, practical universal testing machine. It will pay its own way in the saving of laboratory fees.

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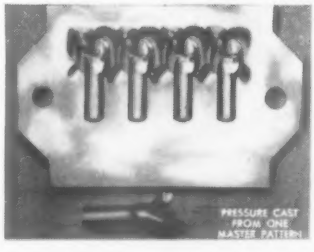

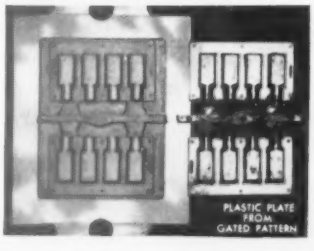

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Yes! Send facts and prices on Economy Molder #7263 To:

an overhead belt to storage hoppers over the molding station.

Practice bombs must be held within the tolerance 3 lb plus or minus 2 oz, and are made eight in a mold, in two rows of four each connected to a central runner. Pouring sprue is located in the center. Molding sand employed is a synthetic type made with sharp sand of 110 to 120 grain fineness. Production is 2000 bombs in an 8-hr shift.

Unique feature of the process is that the iron is melted in a low-frequency, 60-cycle, 125-kw electric furnace of 1000 lb capacity. This furnace is located in a nearby building with a number of other similar units used for melting brass and bronze poured into bars for rolling into sheets, billets, etc. The furnace has a monolithic lining comprised of silicon carbide refractory rammed into place.

Heat With Gas Torch

At the beginning of the melting campaign, the empty furnace is heated with a gas torch for ½-hr to bring the lining up to about 1000°F, and then 700 lb of molten iron is poured into the furnace. That iron is melted in crucibles in the nonferrous foundry. Following addition of the molten iron 900 lb of cold iron composed of 50 per cent pig iron and 50 per cent return scrap is added. Also is included 2 lbs of ferrosilicon per 100 lb of melt.

About 1½ hr is required to melt and bring the charge up to a temperature of 2700° F. Then 400 lb of the charge is poured into a transport ladle, and 400 lb of cold material added to the furnace. In 20 minutes the procedure is repeated, and this cycle is followed throughout the shift. At the end of that time the power on the furnace is reduced to a standby rate just sufficient to keep the charge in a molten condition until the next morning. Power consumption is 460 kw per ton. Composition of the iron poured in the bombs is 3.10 per cent TC, 2.67 per cent Si, 0.057 per cent S, 0.4 per cent P, and 0.54 per cent Mn.

Transport ladle holding 400 lb of iron is placed on a car and pushed the short distance from the melting building to the nonferrous foundry. There it is picked up by a crane and carried to the pouring station at the special molding unit. After the castings are shaken out they are placed in tote boxes and taken to an abrasive blasting room located outside the steel foundry. Final grinding and finishing is accomplished in a section of the steel foundry devoted to similar work on a wide variety of small steel castings.

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Annealability of Malleable Iron

(*Concluded from page* 143)

the right the nodule count.

Fig. 2 was prepared because a 14 per cent rejection was indicated by our quality control method of examining 100 representative test lugs each day, using dated castings. The chart shows the trend but does not show the severest effect where a nodule count of as low as 100 was found in castings.

Fig. 3 was developed because at 4 p.m. a severe oxidizing condition was encountered due to a "bridge over" in the cupola. Operations were stopped and a heavy addition of ferrosilicon was added to the air furnace. All affected iron was held separate through the anneal and no rejection was encountered. However, on other iron not receiving the extra heavy treatment of ferrosilicon, 6 per cent rejection was indicated.

Restore The Nodules

This experience is presented to call attention to the effect of deoxidation, which is known to alleviate the detrimental effect of over-oxidation. It has been demonstrated that it restores, in part at least, the number of nodules. It may be well to point out, however, that deoxidation can be overdone, with attending loss in fluidity, poor sulphide form and danger of primary graphite.

Figs. 4 and 5 are presented to show the effect on nodule count of melting conditions of 25 per cent and under oxidation of silicon. On these days no rejection after anneal was encountered.

This information indicates that malleable iron metallurgists would alleviate foundry castability and annealing troubles if oxidizing conditions during melting were more closely controlled and, in case of inadvertent excessive oxidation, some steps were taken to properly deoxidize the metal before casting.

It also suggests that a closer study of this phase could enlarge on our conception of the formation of "spores" and mechanism of graphitization.

For those who may contemplate checking these results or enlarging upon them it should be borne in mind that the standard deviation is relatively large necessitating a fair number of tests to avoid the possibility of obtaining misleading results.

Ramapo Foundry & Wheel Works, Ramapo, N. Y., lost its machine shop in a fire recently.

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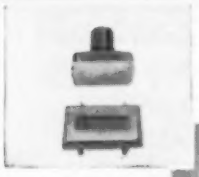

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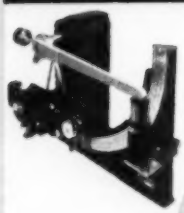

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With the EDITORS

GREETINGS: Once again we have the pleasure of welcoming you to the home town of THE FOUNDRY. The splendid program of technical sessions and the large list of exhibits indicates a week of AFS-sponsored activities in Cleveland which few foundrymen will want to miss. Advance information promises a show which should rank high among other famous Cleveland exhibits of the past. The 1923 exhibit was the first large scale industrial show to be held in Cleveland's Public Auditorium. The 1930 exhibition will be long remembered for the fully mechanized gray iron foundry which was operated in one of the temporary buildings then located on the Mall to the west of the Auditorium. In 1938, exhibitors were able to show the progress that had followed the years of depression. War had become a reality in 1942, and foundrymen toured the exhibit halls to find machines and materials that would permit maximum service to the nation. By 1946, the war was over, and machines for increasing production to meet pent up demands were sought by convention visitors. Perhaps foundrymen will be thinking of improving quality and cutting production costs as they take in the 1950 convention and exhibition.

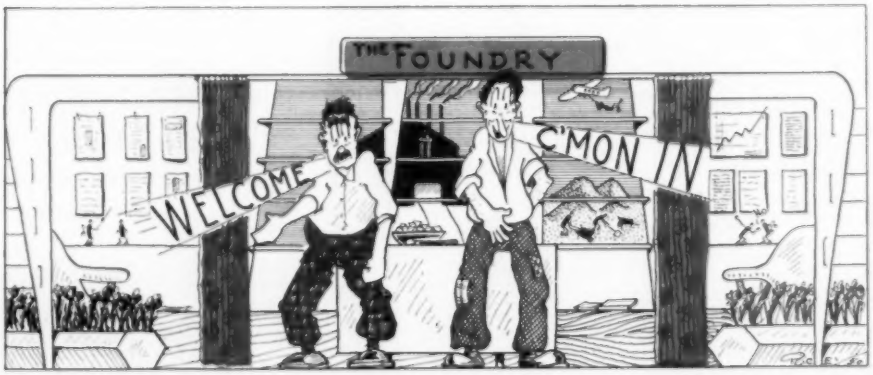
Greeters: Practically all of the gang will be on hand to greet you and perhaps shoot the breeze. Editors will include Frank Steinebach, Bill Gude, Ed Bremer, Pat Dwyer, Bob Herrmann, Erle Ross, Joe Sullivan, Harry Richey, Don Cadot, Robin Allen, Virginia Taylor and Virginia Harms. The business staff will include the following: Jack Lathrop, Al Klingeman, Jack Ahrens, George Pope, Al Johansen, Ken Mountain, Rand Ebersole, Jim Green, Ed Franke and Mary Jane Kimpel.

Resting: When you get tired tramping the spacious exhibit halls, we hope you will drop in at THE FOUNDRY exhibit for a visit. It is Booth 1212 and is located almost in the center of the large upper Lakeside Exhibit Hall. See you there.

Organizations: In addition to being the most frequently used AFS convention city, one of the leading foundry centers of the country, and the home of THE FOUNDRY, Cleveland also is noted as the home of four trade organizations serving the foundry industry, as follows: Foundry Equipment Manufacturers' Association, Engineers Building; Gray Iron Founders' Society, National City-East 6th Building; Malleable Founders' Society, Union Commerce Building; and the Steel Founders' Society of America, Midland Building.

Selling: Fulton Foundry & Machine Co., Cleveland, has a smooth and effective way to get its sales message over to customers. A revival of its technical dinners recently brought together 200 purchasing agents and designing engineers from a radius of approximately 100 miles. Following an excellent dinner, A. C. Denison, company president, and others from the organization, presented data on properties and applications of its meehanite castings. The editor can vouch that it was a good party.

Reprints: During the course of a year, a tremendous number of reprints are prepared by the Penton Press of material appearing in THE FOUNDRY. For example, during 1949 customers purchased 358,385 reprints of advertising pages and 62,125 reprints of editorial articles, or a grand total of 420,510 reproductions.—F.G.S.



You will find easy chairs, and a good view of the passing parade at Booth 1212

Files Complaint on Sand Freight Rate

National Industrial Sand Association, 1325 E Street, Washington, has filed a complaint before the Interstate Commerce Commission protesting the high rates for shipping sand in box cars. Originally box car rates were about 15 per cent higher than open top equipment, but with the percentage increase which has been applied across the board, that differential has increased so that in many instances box car rates are 50 per cent more than open top equipment.

Book Review

Foundry Core Practice, by Harry W. Dietert, cloth, 548 pages, 6 x 9 in., published by the American Foundrymen's Society. Price $10.

The first edition of this volume by Mr. Dietert was one of the most popular books to be published by the society, and many foundrymen, who were unable to obtain copies, will be glad to know that a second and enlarged edition now is available. The new edition has been completely revised to incorporate developments in coreroom practice since 1942. Approximately 40 pages of new material have been added. The work represents an exceedingly broad viewpoint, since over 100 leading authorities in the foundry industry collaborated with Mr. Dietert in preparing the text.

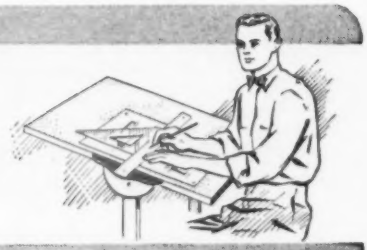
The text discusses at some length the types of core sands and the various locations of deposits throughout the country. This is followed by a discussion of core binding materials and a chapter on core mixtures.

The mechanical problems of producing cores and handling sand are covered in chapters dealing with storage and conditioning of core materials, mixing equipment, core production methods and equipment, core ovens and core baking.

Handling of cores from the time they are baked is covered in chapters dealing with core finishing operations, core coatings, core handling, and core setting. Information also is presented on procedures for determining the properties of cores and core mixtures and for controlling core properties.

The final chapters deal with knocking out cores, reclamation of core sand, the economics of core production, casting surfaces affected by core sand mixtures, and defects caused by faulty cores. An extensive bibliography is provided.

DESIGNERS AND BUILDERS OF SPECIAL FOUNDRY MACHINES...



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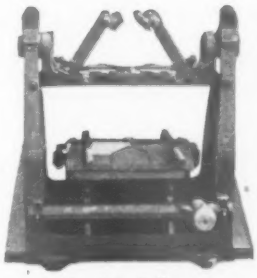

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...TRADE PUBLICATIONS...

Fore More Details on these Items Use Reply Card—Page 297

SECTIONAL CONVEYORS: Robins Conveyors Division, Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.—Bulletin 132 describes a sectional conveyor, easily assembled in the field, made in widths of 18, 24, 30 and 36", with head and tail sections and any desired number of intermediate truss sections to form a conveyor of any length up to limitations of the belt. Two types are described: Protected screw type for conveyors up to 200'; vertical gravity type for longer installations.
For more Details Circle No. 90—Page 297

NONFERROUS CASTINGS: American Brake Shoe Co., National Bearing Division, 4930 Manchester Ave., St. Louis 10—Illustrated booklet gives physical properties and comparative specifications for 27 different bronze alloys and five aluminum and manganese bronzes. It also describes the complete manufacturing facilities the company has available for the manufacture of nonferrous bearings and castings.
For more Details Circle No. 91—Page 297

PNEUMATIC TOOLS: Rotor Tool Co., 17325 Euclid Ave., Cleveland 12—New booklet is entitled "How to Choose and Use Portable Tools." Topical headings are: The economic approach, fallacies in figuring, selecting the right tool, standard and semi-standard tools, compressed air supply and cost, air power distribution, and selecting the right hose.
For more Details Circle No. 92—Page 297

COMBUSTION CONTROLLERS. Selas Corp. of America, Erie Ave. & D St., Philadelphia 34—Bulletin SC-2.1 discusses design, construction, capacities, and accessory equipment of positive and centrifugal type combustion controllers for precise, automatic control in industrial processes which utilize heat.
For more Details Circle No. 93—Page 297

MATERIALS HANDLING: Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg.—Form 1129 covers attachments, tools and accessories designed to lower the cost and increase the ease of handling materials with the company's lift trucks, straddle trucks and mobile cranes.
For more Details Circle No. 94—Page 297

TEMPERATURE REGULATOR: Spence Engineering Co., Grant St., Walden, N. Y.— Illustrated folder describes construction and operation of one of the company's temperature regulators. It shows how the unit is adapted for storage heaters and instantaneous heaters.
For more Details Circle No. 95—Page 297

ALUMINUM PAINT: Skybryte Co., 3125 Perkins Ave., Cleveland 14—Folder presents information and prices on six special aluminum paints: For applying directly over rusted surfaces, for heat resisting interior application, for heat resisting exterior use, for painting rusted chain link fences, an acid and alkali resisting formulation, and a utility aluminum paint.
For more Details Circle No. 96—Page 297

CHOOSING SUPPLIER: Continental Foundry & Machine Co., 220 Grant St., Pittsburgh, Pa.—Booklet entitled "How to Choose a Supplier" discusses basic considerations which should govern the selection of a supplier of steel castings as well as other industrial suppliers.
For more Details Circle No. 97—Page 297

TIMERS: Zenith Electric Co., 152 West Walton St., Chicago 10— Catalog sheet describes an impulse timer without gears and clutch which provides for continuous repeat of impulse signals, or to operate current on and off in equal periods of time. Other timers also are described.
For more Details Circle No. 98—Page 297

TESTING LABORATORIES: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Folder deals with two different, complete high temperature testing laboratories for determining the physical properties of molding materials and ceramics at elevated temperatures.
For more Details Circle No. 99—Page 297

SAFETY: American Optical Co., Southbridge, Mass.—Booklet entitled "How to Set Up and Conduct a Safety Rx Program" contains information on the planning or expanding of a program of eye safety through the use of prescription safety goggles.
For more Details Circle No. 100—Page 297

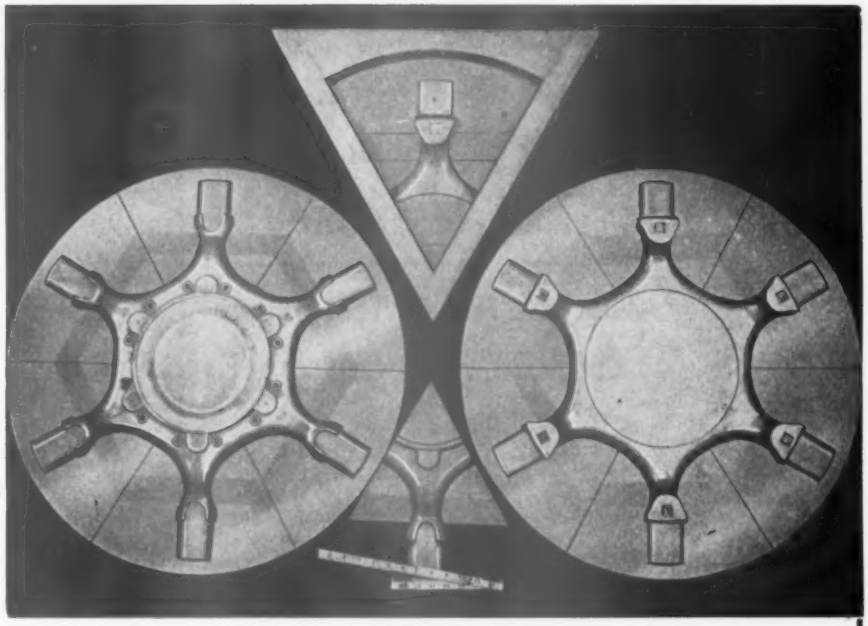
INDUSTRIAL EQUIPMENT: Precision Equipment Co., 3714 North Milwaukee Ave., Chicago 41—Catalog features steel shelving, clothing lockers, drawers, boxes, and other steel equipment. Dimensions and prices are included for each item.
For more Details Circle No. 101—Page 297

GLOVES: B. F. Goodrich Co., 500 South Main St., Akron, O.—Industrial and acid gloves are pictured and described in a new catalog section. Various types are listed, complete specifications given, and the uses for each kind outlined.
For more Details Circle No. 102—Page 297

MOBILE CRANE: Silent Hoist & Crane Co., 885 63rd St., Brooklyn 20—Illustrated bulletin 73 deals with the company's front boom industrial crane of 5 tons capacity. Specifications are included.
For more Details Circle No. 103—Page 297

BLOWERS: Buffalo Forge Co., P. O. Box 985, Buffalo 5—Illustrated bulletins 3014-D covers electric blowers and exhausters. Charts showing capacities and static pressures of various models are included.
For more Details Circle No. 104—Page 297

Illustration at right shows cope and drag equipment for truck wheel, made from one spoke (1-6) of wheel. Photograph by courtesy of Erie Malleable Iron Company.



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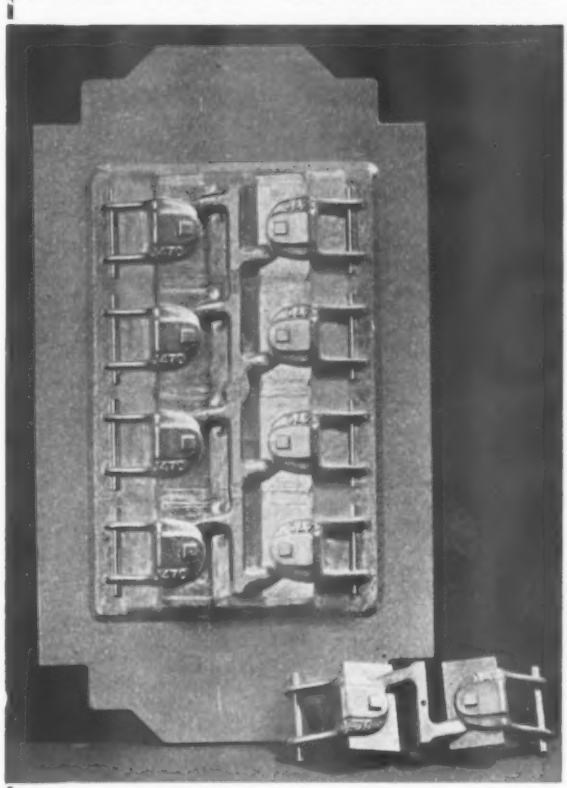

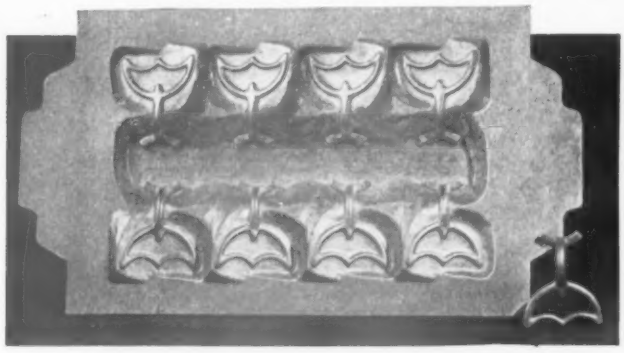

These matchplates were made from single-gated (left) and master patterns (right), respectively.

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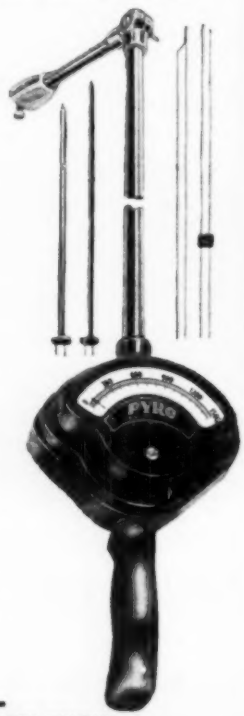

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The PYRO Immersion Pyrometer is shock-proof, moisture-proof, dust-proof and immune to magnetic influences. Withstands ronghest handling. Shielded steel housing. "Protected Type" and "Bare Metal" thermocouples interchange instantly without adjustment or recalibration. Large, 4-inch scale is easy to read. Has exclusive LOCK SWIVEL. Ranges 0-1500 and 0-2500° F.

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February 14, 1950

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We have a customer who had a lot of gated patterns and could not afford aluminum matchplates. We were about to lose the account because we could not afford to make the castings off the gates. Tamastone was the answer and as said above, we have made probably 100 matchplates off of his gates and find they work very satisfactorily.

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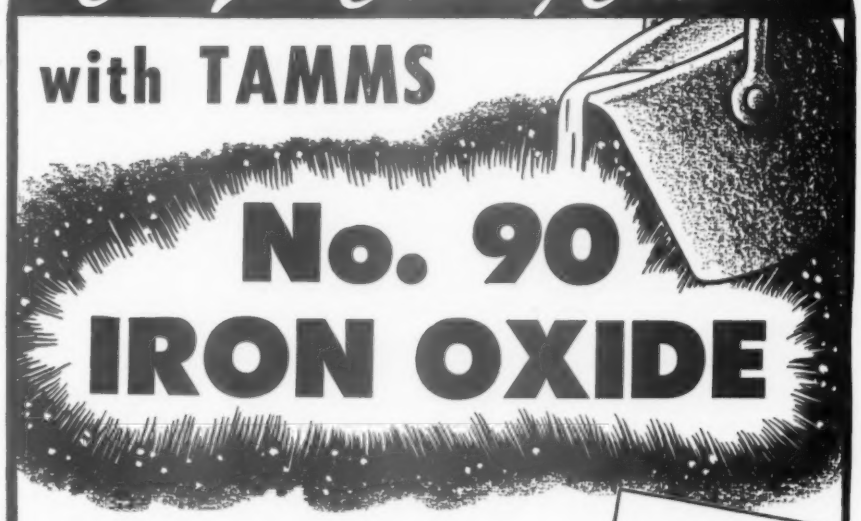

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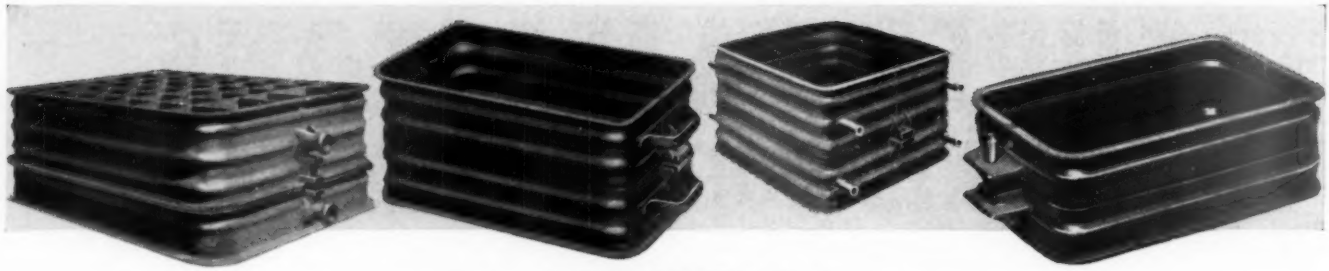
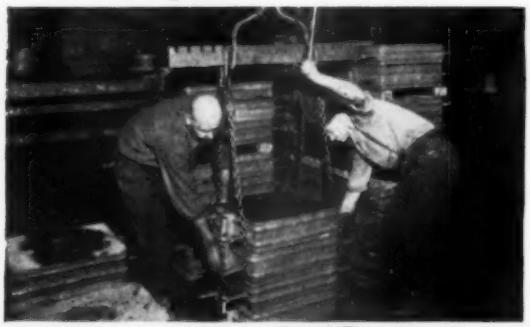


WIDE RANGE OF HANDLES AND PIN LUGS

Assure Efficient Truscon Steel Flask Performance



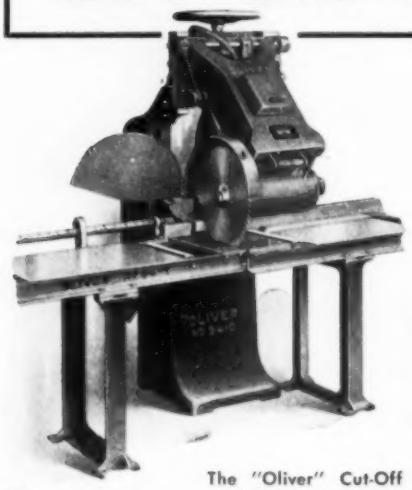
The needs of your particular operations can be met efficiently by Truscon welded end handles, welded corner handles and welded handle sockets for two man handling. Straight trunnions and heavy split trunnions are available for mechanical handling. • Truscon Pin Lugs are available as follows: Single or double-bearing welded combination handle and pin lug for use on one-man flasks. Single or double welded type pin lugs, and double face welded type dowel pin lugs, for use on one or two man flasks. • Ask an experienced Truscon Steel Flask man to help you make the *best* choice. • Write for illustrated catalog on Truscon Steel Flasks.

TRUSCON STEEL COMPANY

PRESSED STEEL DIVISION • 6100 TRUSCON AVENUE • CLEVELAND 4, OHIO

SUBSIDIARY OF REPUBLIC STEEL CORPORATION

"OLIVER" CUT-OFF SAW



for pattern shops

Operates by light touch

Saves space

Accurate to .005-inch

● *See our latest machines for pattern shops in our exhibit at the A.F.A. Convention in Cleveland*

The "Oliver" Cut-Off Saw gives you accurate, straight-line operation—insured by the suspended link motion. Makes straight cuts with saw or cut-off wheel for metals. Saw returns to original locked position automatically with no rebound. Precision-built with ball bearings for smooth operation and low maintenance costs. *Write for Bulletin 94-D.*

OLIVER MACHINERY COMPANY

Since 1890 **GRAND RAPIDS 2, MICHIGAN**

Master Power

HARD CHROMED • PORTABLE PNEUMATIC TOOLS

DO MORE WORK AT LESS COST

because they deliver more power per cubic foot of air consumed, are light in weight for easier maneuverability and they retain their new tool power longer.

ARE PREFERRED BY OPERATORS

because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

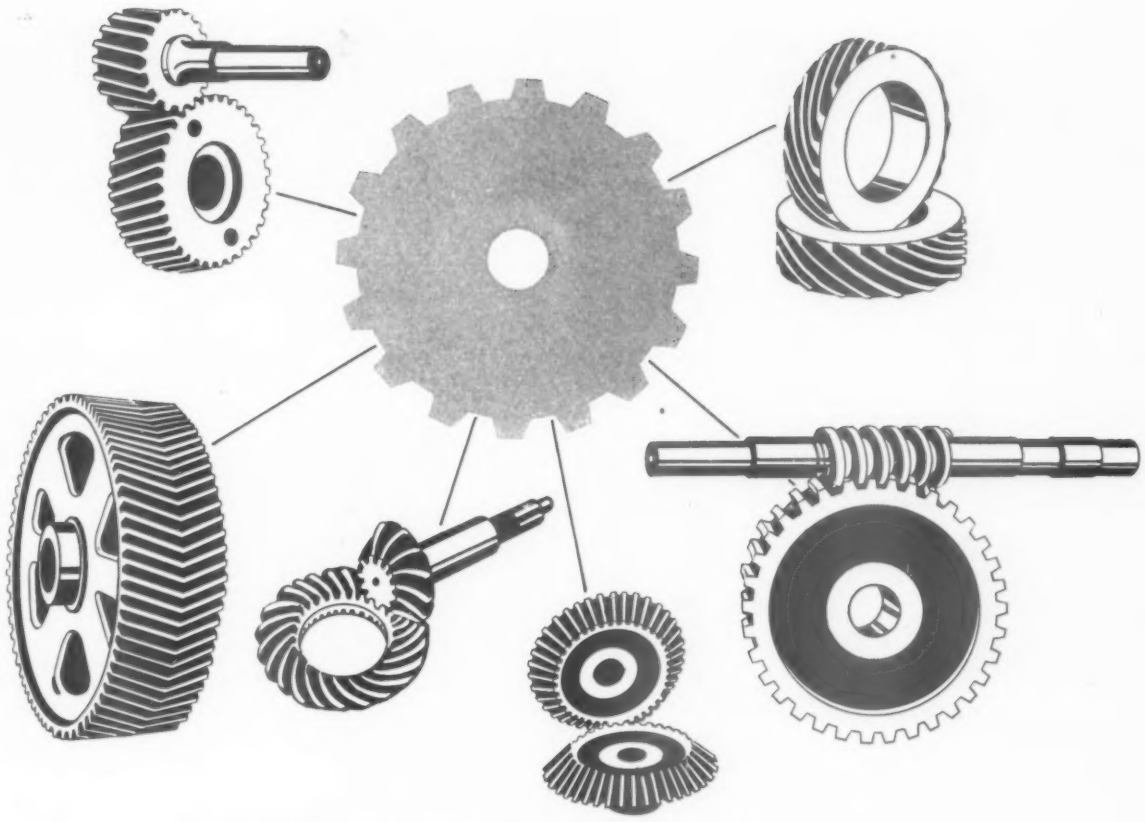
IF YOUR PROBLEM INCLUDES

chipping, ramming, grinding, buffing, sanding or wire brushing, *write us today for full particulars.*

THE MASTER PNEUMATIC TOOL COMPANY, INC.

ORWELL, OHIO • U. S. A.

SALES • SERVICE • STOCK • COAST TO COAST



DO YOU CAST GEARS?

Make them Better . . . at less Cost with HERCULOY GEAR BRONZE

Just look at these typical properties . . .

Tensile strength	65,000 psi.
Yield strength	30,000 psi.
Elongation	25 per cent

. . . all over 50% higher than you get from SAE 65 and similar gear bronzes!

Just check over these special values of Herculoy Gear Bronze . . .

Costs less than high-tin gear bronzes. Hardness, toughness, and resistance to distortion and wear exceptionally high. Corrosion resistance excellent. Combines high yield strength with good ductility. Easy to melt and cast . . . free of dross and fumes. Casts well in sand, permanent, or plaster molds. Has smooth, clear as-cast finish and machines readily.

Write Dept. S. J. today for a 4-page bulletin on Herculoy Bronzes.

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Federated first in the non-ferrous field — FMD

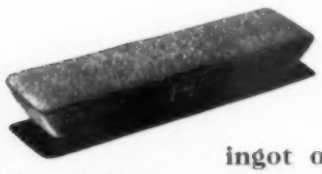
American Smelting and Refining Company, 120 Broadway, New York 5, N. Y.

*means it's better iron from HANNA**

**The best known name in iron*

Hanna has provided foundrymen with constantly improved iron for more than 75 years! Hanna has always been willing to experiment and to incorporate new ideas that control crystal growth and lead to more uniform and higher quality castings of greater strength.

The famous HannaTen 10-pound ingot



The regular Hanna 40-pound pig

You can *depend on Hanna* for best results whether you use the HannaTen ingot or the 40-pound pig. Hanna's wide experience is yours upon request.

New type Hannatite for nodular use

FOUNDRY · MALLEABLE · BASIC
HANNATITE
SILVERY · FERRO-SILICON
Brands:
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THE HANNA FURNACE CORPORATION

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MERCHANT PIG IRON DIVISION OF NATIONAL STEEL CORPORATION

Quantity
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GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866

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FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS
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No. 4 DAYTON RING VALVE BENCH

RAMMER

MORE POWER—MORE SPEED

You'll get more production with these faster, more powerful rammers and at the same time substantially reduce maintenance costs.

The Valve Units will last for years. The Cylinder Bores and Piston Rods are HARD CHROME PLATED which doubles the life of the Rammer. Many of the largest foundries in the country have already adopted them as standard. Made in six sizes to meet every requirement.

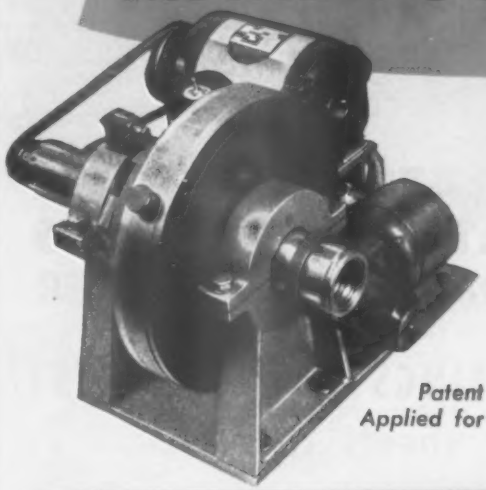
Send for Bulletin 300

DAYTON PNEUMATIC TOOL CO.

Manufacturers of Pneumatic Tools Since 1903

DAYTON, OHIO

NO MORE GUESSWORK...
MAKE YOUR OWN SHOT TESTS!



Patent Applied for

- This amazing new proving machine will give you accurate test of *any* blasting shot or grit.
- Actual blasting conditions are reproduced inside the machine which accurately measures the value of any blasting material and enables you to select the *right* shot or grit for your blasting job.
- Costly waste of "buy and try" is eliminated.
- Ask for a free demonstration in your *own* plant with your *own* shot or grit.

Developed by the makers of "AMASTEEL Trualloy", "PEENBLAST", "CLEANBLAST" and "ALLOY 99"

PRODUCERS OF
PEENBLAST
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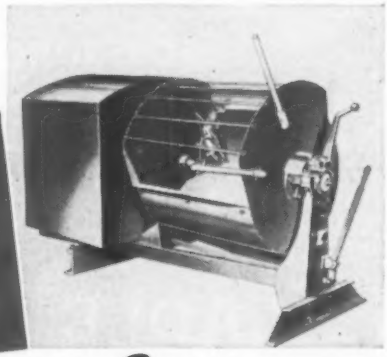
ALLOY METAL ABRASIVE CO.

311 WEST HURON ST. ANN ARBOR, MICH.

CMC

WONDER *Sand* MIXERS



New Mixing Efficiency

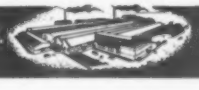
EXCLUSIVE TRIPLE MIXING HOES . . .

Tops in the field! Triple mixing Hoes have adjustable blades . . . easily set for correct clearance. Mixing is *thorough* and "end to end". Advance CMC design makes charging and discharging *easier than ever before!* 6 cu. ft. capacity shown. Write today for full details.

RENEWABLE DRUM LINERS

Easily replaceable, full-hard abrasion resistant alloy steel drum liners are your assurance of lowest upkeep and minimum operating costs.

CONSTRUCTION MACHINERY CO'S. WATERLOO, IOWA, U.S.A.



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Pressure Cast by the Plaster Process Method

COPE & DRAG PLATES, MATCH PLATES, GANG CORE BOXES, DRYER PATTERNS, PATTERN CASTINGS ACCURATELY DUPLICATED FROM YOUR MASTER

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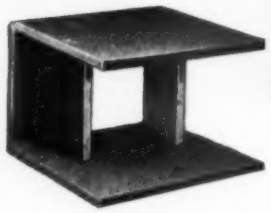
BUFFALO "Double Angle" CHAPLETS



★ Greater Strength
★ Burn in more easily
★ Less Chilling

The extra strength of this exclusive *Angle Design* (originated and patented by Combined Supply and Equipment Co.) permits the use of these Buffalo Chaplets in thinner gauges.

Direct advantages are the ability to burn in more easily and a greater resistance to chilling.

Thorough coating promotes immediate fusion with the molten metal.

Your requirements may be met with Buffalo "Angle Stem" (Single) or "Double Angle" Chaplets, in a range of four metal gauges. Complete information, samples and prices promptly furnished.

CATALOG NO. 15 MAILED ON REQUEST
Contains useful data on complete line of chaplets

Combined SUPPLY & EQUIPMENT CO., INC.
211 CHANDLER ST., BUFFALO 7, N. Y.

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NONFERROUS FLUXES
•
LADLE COAT
•
PERMANENT MOLD SPRAY

Stocked by the Following Jobbers

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ROSSBOROUGH SUPPLY COMPANY
1457 West Ninth St. Cleveland, Ohio

No need for battleship *thickness* in flask walls. Correctly engineered thickness, highly durable materials, and scientific design, as exemplified in Truscon Steel Flasks, give battleship *service* without unnecessary weight or shop handling costs. ● Truscon Steel Flasks have a long record of success in foundry operations, particularly under extreme conditions of heavy service. An experienced Truscon man will be glad to explain the many advantages which Truscon Steel Flasks offer you.

Write for illustrated and descriptive catalog.

TRUSCON STEEL COMPANY

PRESSED STEEL DIVISION • 6100 TRUSCON AVENUE • CLEVELAND 4, OHIO

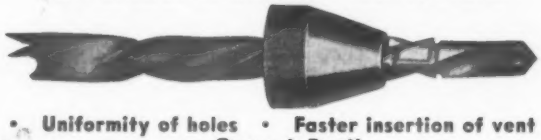
SUBSIDIARY OF REPUBLIC STEEL CORPORATION

SERVING YOU

in

"Core Blowing Operations"

INSERTING DRILL



• Uniformity of holes • Faster insertion of vent • Correct Depth

CORE BOX VENTS

DEEP HEAD Wide or Narrow Slots .014 .010

SHALLOW HEAD Wide or Narrow Slots .014 .010

MESH .035

VENT CLEANER

for Cleaning Slots

Made of Tempered Steel, Easy to Use

C. M. SMILLIE & CO.

1124 WOODWARD HGTS., FERNDALE 20, MICHIGAN

TOOLS • PRECISION MACHINED and GROUND PARTS • FIXTURES

WESCO CORE BLOWER for SHORT or Long Runs

Small Foundry saved 25% of cost in first month of operation

Large Range— from smallest core to 6# in weight

No channeling

Automatic sand filler

Air Chuck optional

You need this core cost cutter. Write for Bulletin "F"

WESTERN HDWE & SPECIALTY MFG. CO.

3830 No. Fratney St., Milwaukee 12, Wis.

Clean Flasks Faster . . .
Eliminate Flask Damage

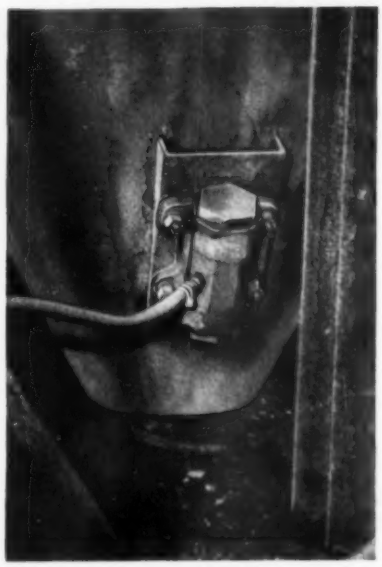
"BRANFORD" FLASK RAPPERS

Powerful, dependable units — quickly and easily moved from one station to another. Day after day "BRANFORD" pneumatic Flask Rappers deliver unfailing service under the toughest conditions.

Made in seven sizes to handle flasks from 20 inches square up to 20 feet by 24 feet by four feet deep—green or dry sand. Jaw takes wide variation of flask flanges.

Send for Shakeout Questionnaire

Speed Up Production . . .
By Eliminating Slow-downs in Feeders, Hoppers & Storage Bins
Use "BRANFORD" Hopper and Bin VIBRATORS



Three inch "BRANFORD" four bolt side mounting vibrator on a 4½ ton conical sand storage bin.

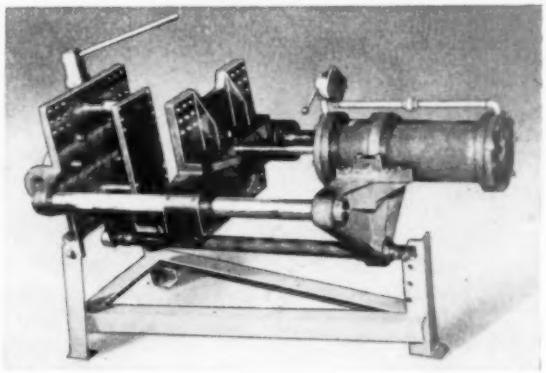
No poking—no sledging. The heavy foot-pound impact of the rugged "BRANFORD" Pneumatic vibrator completely breaks up clogged or hanging materials.

Send your equipment specifications for our recommendations and quotation. Complete catalog on request.

1915 BRANFORD VIBRATORS U.S.A.

NEW HAVEN VIBRATOR CO.
130 CHESTNUT STREET NEW HAVEN 7, CONN.

PERMANENT MOLD MACHINE
SAVE ON TIME & MOLD COSTS
USE INSERT TYPE MOLDS



FEATURES

- ADJUSTABLE FOR VARIOUS THICKNESS MOLDS
- USE EJECTOR PLATE VERTICAL OR HORIZ.
- TILTING STAND
- HARDENED RACKS & PINION
- GROUND GUIDE BARS
- ADJUSTABLE BAR CENTERS
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- MEEHANITE FRAMES
- BUILT IN TWO SIZES

FOR INFORMATION & PRICES WRITE

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DESIGNERS & MANUFACTURERS OF PERMANENT MOLDS

BLOWERS and EXHAUSTERS for AIR and GAS

CENTRIFUGAL TYPE
SINGLE AND MULTI-STAGE
½ LB. TO 7 LBS. PRESSURE
½ HP. TO 250 HP.

MULTI-STAGE STEEL BLOWER

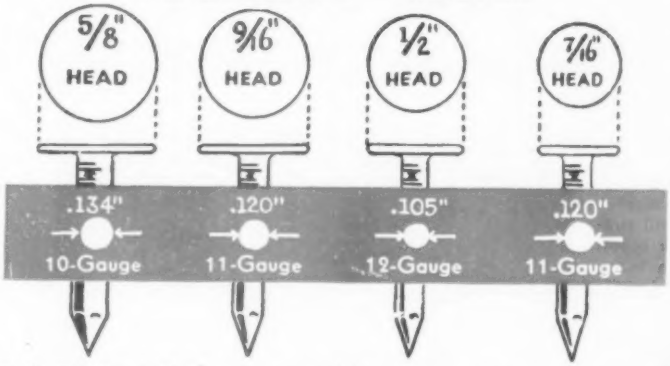
Since back in the '90's, these trustworthy Blowers and Exhausters have been faithfully serving American industry—for agitation and aeration — for combustion — for cooling and ventilating — for gas and acid production — for conveying — and numerous other applications having various pressure and vacuum requirements.

If you have a problem in handling air or gases of various densities, temperatures or chemical compositions, write today for latest bulletin, B-5, on Lamson Blowers and Exhausters.

LAMSON CORPORATION
BLOWER DIVISION
514 LAMSON ST. SYRACUSE 1, N. Y.

ANGELL . . . PROVEN PRESSURE PROOF CHAPLETS

Producers of SUPER HEAD FOUNDRY NAILS



3/8", 9/16" & 1/2" Heads available up to 3 inches in length

Standard Foundry Nails available in all lengths.

All styles of Chaplets Accurately Made for Better Castings

THE ANGELL NAIL & Chaplet Company
4580 East 71st Street
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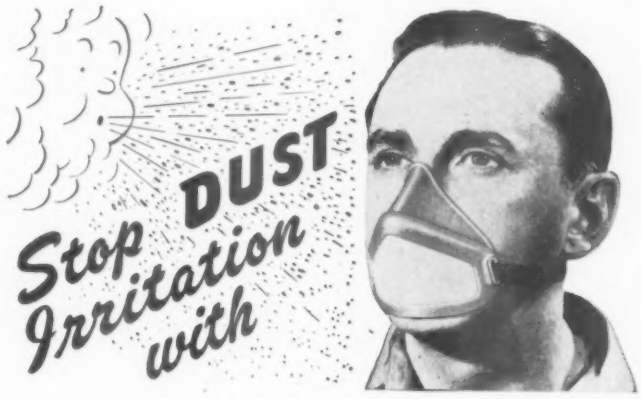

new sensational FLEX-A-FOAM — FILTER MASK —

Easier to breathe through and talk through than an ordinary handkerchief . . yet filters non-toxic nuisance dusts as small as 1/25000 of an inch!

- Extremely light in weight — only 1 ounce complete.
- Self-adjusting to every face size.
- Simple in design with only 4 interlocking parts.

SAMPLE $1.50 POST PAID

Dust protection your workers will welcome and WEAR!

Write TODAY for descriptive circular

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USE THE IDEAL FUEL FOR . . .

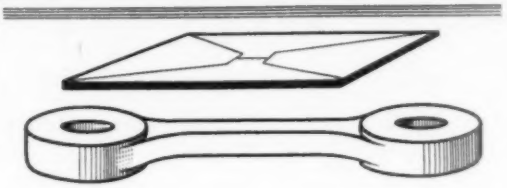
DRYING MOLDS . . . PREHEAT CASTINGS . . . ON MOLTEN METALS . . . RECARBONIZE STEEL . . . MELT SOFT METALS

● The long-burning, uniform, penetrating heat of Ford Charcoal Briquets makes it the ideal fuel for an increasing list of foundry uses. And it's portable—to save you valuable time, space and money. Order today, and write for interesting information on use and equipment:

FORD MOTOR COMPANY
Special Products Department
IRON MOUNTAIN • MICHIGAN

Ford
Charcoal Briquets
The *heat-packed* charcoal

Gamma rays .....
unexposed film .....
steel casting .....

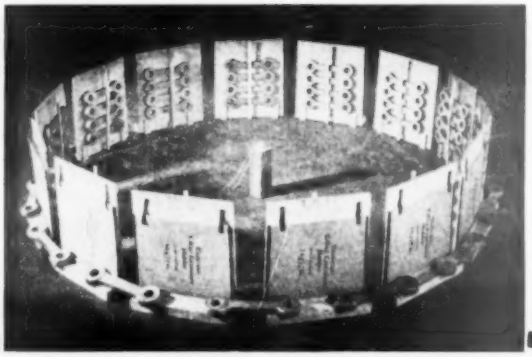


and there you have a method whereby you can increase your foundry production and improve your practice!

RADIUM RADIOGRAPHY

is new, compared with X-ray radiography, but its peculiar advantages have been finding increasing favor with steel foundries. The first commercial radiograph with radium was made in 1930—an exposure of the sternpost of the cruiser "Chester"—and by 1948 200 steel foundries throughout the country were using radium radiography. The equipment is absurdly simple, and, since it may be rented or leased, no capital expenditure is necessary. No special training is required to operate it, either. The constant activity of radium, the even dispersion of its rays with a minimum of scattering; the portability of the equipment and simplicity of operation all combine to make radium radiography a sound commercial proposition for manufacturers of steel castings. Write today for case histories and additional information.

Illustration shows 60 steel castings being photographed simultaneously. The gamma rays, flying in all directions, go through all the castings at once, making 60 exposures of the 60 castings.



RADIUM CHEMICAL CO., INC.

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SAVE KW.'S

BE A METER MISER

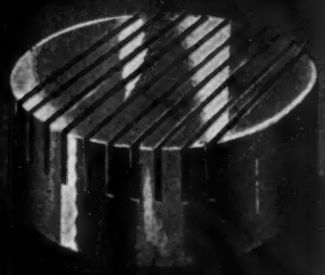
Control overheating—be a meter miser. Use the Wheelco Molten Metal Thermocouple with the adjustable extension as a sensing unit and the "Distant-View" Scale Pyrometer for accurate quick-checks of furnace, ladle and pouring temperature to achieve added production economy.

Wheelco instru*mentality* in action gives you finer finished products, lower production costs — ask for Bulletin MC-1, Wheelco Instruments Company, 724 W. Harrison Street, Chicago, Illinois.

Visit the Wheelco Booth No. 1128
American Foundryman's Society, Cleveland, May 8-12

wheelco *electronic controls*

Precision



CORE BOX VENTS

Here's part of a complete line of DEMMLER core box vents—rigidly constructed in varying sizes of slotted brass—slotted steel—and screen mesh. Orders filled promptly from stock.

BRASS SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: ⅛", 3/16", ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1¼", 1½"

STEEL SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: ⅛", 3/16", ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1¼", 1½"

SCREEN TYPE CORE BOX VENTS
Mesh: #30, #40, #50.
Diameters: ⅛", 3/16", ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1¼", 1½"

SPECIFICATION CIRCULAR ON REQUEST

Wm. **DEMMLER** *& Bros.*
Kewanee, Illinois

There's a Complete Line of CASTMASTER Die Casting Machines

HIGH SPEED PRODUCTION MODELS FOR PRODUCING SMALL TO THE LARGEST SIZE CASTINGS!

Precision Built by Die Casting Engineers

● Cast-Master Die Casting Machines are designed and built by engineers with years of experience in the Die Casting Industry. Each model has been given months of actual operation under the most severe conditions.

All Cast-Master Models Can Be Converted From Cold Chamber to Gooseneck!

MILLER•TAYLOR TOOL CO.
5005 EUCLID AVENUE • CLEVELAND 3, OHIO

Send for COMPLETE ILLUSTRATED CATALOG

LOOKING FOR A PLACE TO SAVE?

You Can Cut Your *Wheel Costs* With a MARSCHKE GRINDER!

Every grinder in the Marschke line is built with two objectives in mind: (1) to give you a machine which will get the most work and the longest wear out of your grinding *wheels;* and (2) give you a machine with long, reliable and trouble-free service. The first is achieved through *elimination of vibration;* the second, through *quality materials* and engineering know-how.

The name "Marschke" means more than just quality, it means a complete *line* of grinding tools, adaptable to the solution of any grinding problem. Give us information on what you're up against, maybe we can suggest a solution.

VONNEGUT
MOULDER CORPORATION
1839 MADISON AVENUE • INDIANAPOLIS 25, INDIANA

Patented
Open Head Shoulder Radiator Chaplet

• REDUCES CASTING REJECTS

by firmer Core Support

We also make **MOTOR CHAPLETS**

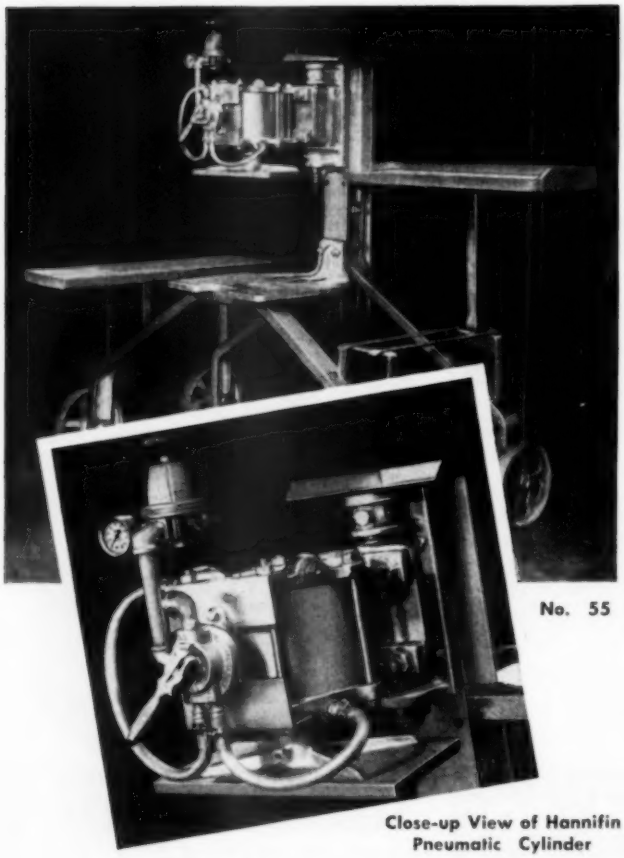
BOILER CHAPLETS, FORGED HEAD CHAPLETS, FITTED HEAD CHAPLETS, DOUBLE HEAD CHAPLETS and other types.

This Patented Chaplet holds cores better because its Open Head permits sounder packing of sand under head and around the stem.

Write for Bulletin No. 48

CLEVELAND CHAPLET & MFG. CO.
1197 W. 67th St., Cleveland, Ohio

CLEVELAND *Chaplets*
Since 1890



No. 55

Close-up View of Hannifin Pneumatic Cylinder

THIS MOLINE MACHINE TURNS OUT THE WORK FASTER!

THE MOLINE 55 MOLDING MACHINE ILLUSTRATED IS EQUIPPED WITH A HANNIFIN PNEUMATIC CYLINDER

Here is a heavy duty portable machine with a power feature. The Hannifin air cylinder enables a molder to turn out consistently good molds. He can do it steadily up to the end of his working day—without fatigue. Large flasks and heavy jobs can be handled better. Naturally the Moline 55 increases production and lowers costs. The men who use them like them! Write for detailed information and prices.

SEVENTY YEARS OF SERVICE

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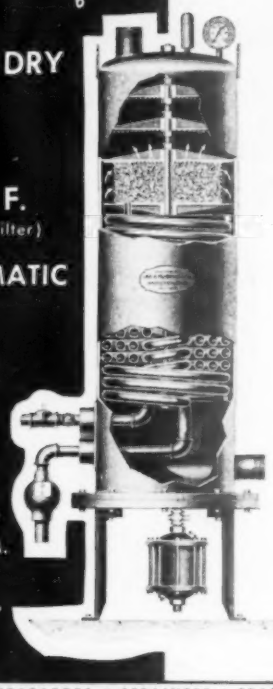

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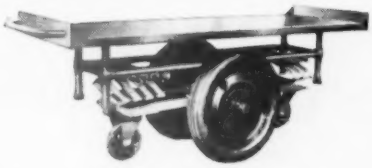

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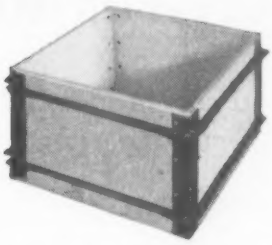

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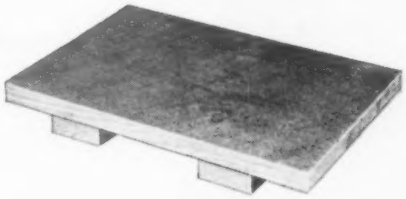

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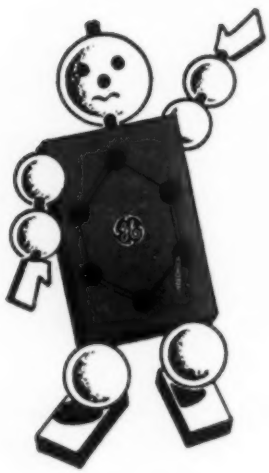

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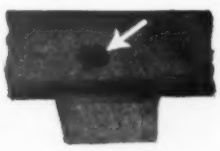

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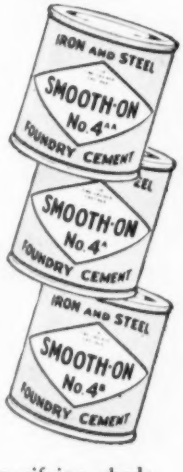

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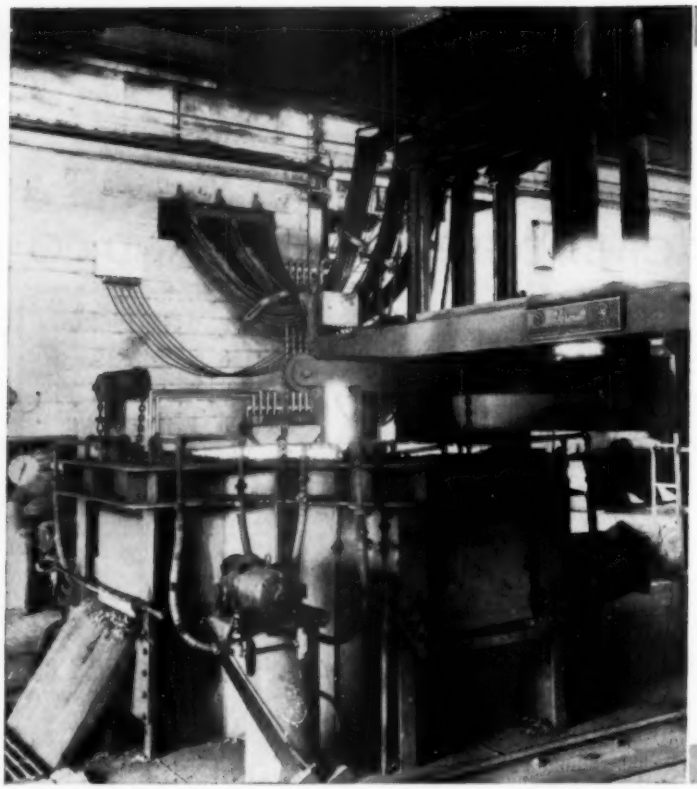

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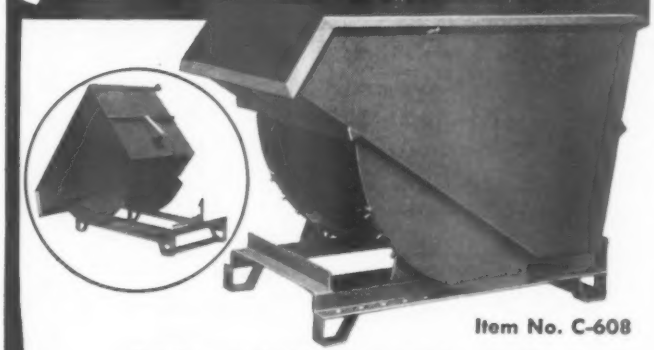

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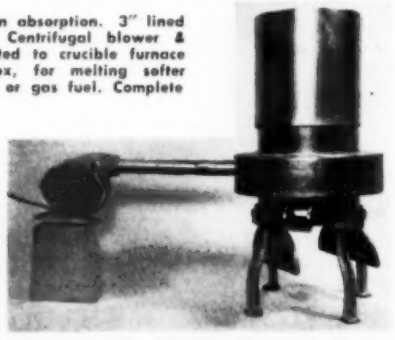

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Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.
W. G. Reichert Engineering Co., 1060 Broad St., Newark, New Jersey

FOUNDRY NAILS

Capewell Mfg. Co., Hartford, Conn.
Crescent Brass & Pin Co., 5766 Trumbull Ave., Detroit, Mich.
Standard Horse Nail Corp., New Brighton, Pa.

FOUNDRY SHOES (Safety)

Safety First Shoe Co., Holliston, Mass.

FOUNDRY SHOVELS (See SHOVELS)

FOUNDRY SUPPLIES

Rossborough Supply Co., 1456 W. 9th St., Cleveland 13, Ohio

FOUNDRY SUPPLY HOUSES

Combined Supply & Equipment Co., Inc., 215 Chandler St., Buffalo 7, N. Y.
Eastern Clay Products, Inc., Jackson, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundries Materials Co., Coldwater, Mich.
Freeman Supply Co., 1152 E. Broadway, Toledo 5, O.
Stevens, Inc., Frederic B., Detroit 16, Mich.

FOUNDRY SYSTEMS

W. G. Reichert Engineering Co., 1060 Broad St., Newark, New Jersey

FURNACES (Aluminum & Magnesium Billets)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

FURNACES (Aluminum & Magnesium Forgings)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

FURNACES (Aluminum Melting)

Ajax Engineering Corp., Trenton, N. J.
Campbell-Hausfeld Co., Harrison, O.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.

—When writing advertisers, please mention THE FOUNDRY—

FURNACES (Aluminum Rivet Heating)

Ajax Electric Co., Inc., Philadelphia 23, Pa.

FURNACES (Annealing)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co. Minneapolis 14, Minn.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Electric Furnace Co., Salem, Ohio.
Foundry Equipment Co., 1851 Columbus Rd., Cleveland 13, Ohio.
Holcroft & Company, 6545 Epworth Blvd., Detroit 10, Mich.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.

FURNACES (Crucible Melting)

Ajax Electrothermic Corp., Trenton, N. J.
Ajax Metal Co., Philadelphia 23, Pa.
Campbell-Hausfeld Co., 300-320 Moore St., Harrison, O.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

FURNACES (Electric Melting)

Ajax Electric Furnace Corp., 46 Richmond St., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Trenton, N. J.
Ajax Engineering Corp., Trenton, N. J.
Ajax Metal Co., Philadelphia 23, Pa.
American Bridge Co., Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Greene Electric Furnace Co., 2702 6th So., Seattle 4, Wash.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Gas or Oil Fired)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Campbell-Hausfeld Co., Harrison, O.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Electric Furnace Co., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lanly Company, 750 Prospect Ave., Cleveland 15, Ohio.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

FURNACES (Gray Iron Melting)

American Bridge Co., Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.

FURNACES (Heat Treating)

Ajax Electric Co., Inc., Philadelphia 23, Pa.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Electric Furnace Co., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Holcroft & Company, 6545 Epworth Blvd., Detroit 10, Mich.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.

FURNACES, HEAT TREATING (Electric)

Ajax Electric Co., Inc., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Trenton, N. J.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

FURNACES (Induction Heating)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

FURNACES (Malleable Annealing)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Electric Furnace Co., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13 Ohio.
General Electric Co., Schenectady, N. Y.
Holcroft & Company, 6545 Epworth Blvd., Detroit 10, Mich.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Malleable Melting)

American Bridge Co., Pittsburgh 19, Pa.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Nonferrous Melting)

Ajax Electrothermic Corp., Trenton, N. J.
Ajax Engineering Corp., Trenton, N. J.
Ajax Metal Co., Philadelphia 23, Pa.
Campbell-Hausfeld Co., Harrison, O.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

FURNACES (Powdered Coal)

Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Steel Melting)

Ajax Electrothermic Corp., Trenton, N. J.
American Bridge Co., Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.

FURNACE BLOWERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Campbell-Hausfeld Co., Harrison, O.
Eclipse Fuel Engineering Co., 711 So. Main St., Rockford, Ill.
Joy Mfg. Co., La-Del Division, New Philadelphia, Ohio.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.

FURNACE LININGS

Campbell-Hausfeld Co., Harrison, O.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Building, Buffalo 2, N. Y.
A. P. Green Fire Brick Co., Mexico, Missouri.
Ironton Fire Brick Co., Ironton, O.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
National Carbon Co. Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.
United States Graphite Co., Saginaw, Mich.

GAGGERS

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Wadsworth Equipment Co., 2457 Mogadore Rd., Akron, Ohio

GAS (Oxygen, Acetylene, Industrial)

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

GAS BURNERS

Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard St., Chicago 12, Ill.

GENERATORS (Acetylene)

Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

GLOVES (Industrial, Safety)

American Optical Co., Southbridge, Mass.
Safety Clothing & Equipment Co., 7016 Euclid Ave., Cleveland 3, Ohio.

GOGGLES and EYE PROTECTORS

American Optical Co., Southbridge, Mass.
Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
Goggle Parts Company Inc., 1468 West 9th St., Cleveland 13, Ohio
Wilson Products Inc., Reading, Pa.

GRAPHITE

Asbury Graphite Mills, Asbury, N.J.
Acheson Colloids Corp., Port Huron, Mich.
Bloomsbury Graphite Co., Bloomsbury, N. J.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
International Graphite & Electrode Corp., St. Marys, Pa.
National Carbon Co. Inc., Carbon Products Div., 30 E. 42nd St., New York 17.
Superior Flake Graphite Co., 33 S. Clark St., Chicago 3, Ill.
United States Graphite Co., Saginaw, Mich.

GRINDERS (Electric Portable)

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Independent Pneumatic Tool Co., Aurora, Ill.
Rotor Tool Co., 17325 Euclid Ave., Cleveland 12, Ohio.
U. S. Electrical Tool Co., Cincinnati 4, O.

GRINDERS (Pneumatic Portable)

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Tex.
Independent Pneumatic Tool Co., Aurora, Ill.

GRINDERS (Pneumatic Portable) (Cont'd.)

Master Pneumatic Tool Co., Inc., Orwell, Ohio.
Rotor Tool Co., 17325 Euclid Ave., Cleveland 12, Ohio.

GRINDERS (Surface, Bench, Disc., Floor)

Fox Grinders, Inc., Oliver Bldg., Pittsburgh 22, Pa.
Independent Pneumatic Tool Co., Aurora, Ill.
U. S. Electrical Tool Co., 2488 River Rd., Cincinnati 4, O.
Vonnegut Moulder Corp., 1515 Madison Ave., Indianapolis 2, Ind.

GRINDERS (Swing Frame)

Fox Grinders, Inc., Oliver Bldg., Pittsburgh 22, Pa.
Sutter Products Co., Dearborn, Mich.
Vonnegut Moulder Corp., 1815 Madison Ave., Indianapolis 2, Ind.

GRINDING WHEELS—See ABRASIVE WHEELS

GRINDING WHEEL DRESSERS

Carborundum Co., Niagara Falls, N. Y.
Desmond-Stephan Mfg. Co., Urbana, O.

GRINDSTONES

Bay State Abrasive Products Co., Westboro, Mass.

GRIT (Abrasive)

Alloy Metal Abrasive Co., Ann Arbor, Mich.
American Steel Abrasives Co., Galion, O.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Carborundum Co., Niagara Falls, N. Y.
Clayton Sherman Abrasives Co., 3896 Lonyo Rd., Detroit 10, Mich.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio.
Globe Steel Abrasive Co., Mansfield, Ohio.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Metal Blast, Inc., 871 E. 67th St., Cleveland, Ohio.
Pangborn Corp., Hagerstown, Md.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.

HAMMERS (Chipping)

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas.
Dayton Pneumatic Tool Co., Dayton 1, Ohio.
Independent Pneumatic Tool Co., Aurora, Ill.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Master Pneumatic Tool Co., Inc., Orwell, Ohio.
Schramm Inc., West Chester, Pa.

HARDNESS TESTING EQUIPMENT

Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Steel City Testing Machines Inc., 8843 Livernois Ave., Detroit 4, Mich.
Foxboro Company, Foxboro, Mass.
Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.

HEAT CONTROL AND RECORDING DEVICES (Cont'd.)

Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.

HEATERS (Gas, Oil, Electric)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lanly Co., 750 Prospect Ave., Cleveland 15, Ohio.
Newcomb-Detroit Co. Inc., 5741 Russell St., Detroit 11, Mich.
Ross Engineering Corp., J. O., 350 Madison Ave., New York 17, N.Y.

HEATERS (High Frequency Electric)

Ajax Electrothermic Corp., Trenton, N. J.

HEATERS (Indirect Fired)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

HEATERS (Space, Unit, Direct Fired)

Dravo Corp., Neville Island, Pittsburgh 25, Pa.

HEATERS (Space, Unit, Oven, Water)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Newcomb-Detroit Co. Inc., 5741 Russell St., Detroit 11, Mich.

HELMETS (Blasting)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
American Optical Co., Southbridge, Mass.
Pangborn Corp., Hagerstown, Md.
Safety Clothing & Equipment Co., 7016 Euclid Ave., Cleveland 3, Ohio.

HELMETS (Welding)

American Optical Co., Southbridge, Mass.

HOISTS (Air)

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis 20, Mo.
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.

HOISTS (Chain)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.

HOISTS (Electric)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Modern Equipment Co., Port Washington, Wis.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.

HOISTS (Electric) (Cont'd.)

Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

HOISTS (Hand)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Clipper Mfg. Co., 2800 Warwick St., Kansas City, 8, Mo.

HOODS (Shakeout, pouring)

Claude B. Schneible Co., 2827 25th St., Detroit 16, Mich.

HOPPERS (Sand)

Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.

HOSE (Air, Blasting, Water, Gas)

Gardner-Denver Co., Quincy, Ill.
Hewitt Rubber Div. Hewitt-Robins Div., Inc., 240 Kinsington Ave., Buffalo 5, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Pangborn Corp., Hagerstown, Md.
Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.
Schramm Inc., West Chester, Pa.

HYDRAULIC CLEANING EQUIPMENT

Hydro-Blast Corp., 2050 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.

HYDRO FINISHING EQUIPMENT

Pangborn Corp., Hagerstown, Md.

ILLUMINATORS (X-Ray Film)

Eastman Kodak Co., Rochester, N. Y.

IMPREGNATING SYSTEMS

Empire Varnish Co., 2636 E. 76th St., Cleveland 4, O.
Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.
Tincher Products Division, Ideal Industries, Sycamore 12, Ill.

INDUSTRIAL ENGINEERING SERVICE

Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.

INGOT MOLDS

Acme Foundry Co., Detroit 16, Mich.

INGOTS (Nonferrous)

Ajax Metal Co., Philadelphia 23, Pa.
Federated Metals Div. of American Smelting and Refining Co., 120 Broadway, New York 5
Apex Smelting Co., 2537 West Taylor St., Chicago 12, Ill.
Federated Metals Div., American Smelting and Ref. Co., New York 5
Frontier Bronze Corp., 818 Elmwood Ave., Niagara Falls, N. Y.
International Nickel Co., Inc., 67 Wall St., New York City 5
R. Lavin & Sons Inc., 3126 So. Kedzie Ave., Chicago 23, Ill.
Northwestern Iron & Metal Co., 900 "T" Street, Lincoln, Nebraska
Sonken-Galamba Corp., Kansas City 18, Kansas

INGOTS (Nonferrous) (Cont'd.)

Western Metals Co., 3201 So. Kedzie Ave., Chicago 23, Ill.

INJECTION MOLDING MACHINES

Lester-Phoenix Inc., 2711 Church St., Cleveland 13, Ohio
W. McGeough, Milwaukee 7, Wis.

INOCULANTS

Carborundum Co., Perth Amboy, N. J.

INSERTS (Ceramic)

American Lava Corp., Chattanooga, Tenn.

IRON CEMENT

Smooth-On Mfg. Co., 570 Communipaw Ave., Jersey City 4, N. J.

IRON ORE

Pickands, Mather & Co., Cleveland 14, O.

IRON OXIDES

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Delta Oil Products Co., Milwaukee 9, Wis.
Tamms Industries Inc., 228 N. LaSalle St., Chicago 1, Ill.

JACKETS (Mold)

Adams Co., Dubuque, Iowa
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Diamond Clamp & Flask Co., Richmond, Ind.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio
Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.
Peerless Mineral Products Co. Conneaut, Ohio

LABORATORY EQUIPMENT (Chemical)

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.

LABORATORY EQUIPMENT (Physical)

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Norton Co., Worcester 6, Mass.

LADLES

Industrial Equipment Co., Minster, O.
Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.
Modern Equipment Co., Port Washington, Wis.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

LADLE LININGS

A. P. Green Fire Brick Co., Mexico, Missouri
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Ironton Fire Brick Co., Ironton, Ohio

LEAD

Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5.

LEGGINGS (Safety)

Safety Clothing & Equipment Co., 7016 Euclid Ave., Cleveland 3, Ohio.

LINSEED OIL

Hercules Powder Co., Wilmington 99, Del.

LOADERS

Clearfield Machine Co., Clearfield, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

LOADERS (Tractor-Mounted)

Frank G. Hough Co., Libertyville, Ill.

LUBRICANTS (Industrial)

Acheson Colloids Corp., Port Huron, Mich.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
United States Graphite Co., Saginaw, Mich.

LUMBER (All kinds)

Dougherty Lumber Co., 4300 East 68th St., Cleveland 5, Ohio.

MACHINE KEYS

Standard Horse Nail Corp., New Brighton, Pa.

MAGNESIUM (Ingots)

Apex Smelting Co., 2537 West Taylor St., Chicago 12, Ill.
Federated Metals Division of American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

MAGNET CONTROLLERS

Ohio Electric Mfg. Co., 5906 Maurice Ave., Cleveland, Ohio

MAGNETS

Dings Magnetic Separator Co., 4740 Electric Ave., Milwaukee 7, Wis.
Ohio Electric Mfg. Co., 5906 Maurice Ave., Cleveland, Ohio.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

MANGANESE (Briquets)

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

MATCH PLATE METAL

Federated Metals Division of American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.

MATCHPLATES

Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.
Central Pattern Co., Quincy, Ill.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Industrial Pattern Works, 2625 West Belmont Ave., Chicago 18, Ill.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio
Plaster Process Castings Co., 6922 Carnegie Ave., Cleveland 3, O.
Pressure Match Plate Co., 1013 N. Front St., Philadelphia 23, Pa.
Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland 3, O.
Arthur E. Will, 643 West 11th St. Erie, Pa.

MATERIALS HANDLING EQUIPT.

Frank G. Hough Co., Libertyville, Ill.

MATERIALS HANDLING DESIGN

Frank D. Campbell, 332 So. Michigan Ave., Chicago, Ill.

MATERIALS HANDLING (Hoists)

Chisholm-Moore Hoist Corp. and Columbus-McKinnon Chain Corp., Tonawanda, N. Y.

MECHANICAL ENGINEERS

Frank D. Campbell, 332 So. Michigan Ave., Chicago, Ill.
Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.

MELTING POTS

Acme Foundry Co., Detroit 16, Mich.

METAL CLEANING EQUIPMENT

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

METALLIC SPRAYING EQUIPMENT

Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.

METALLIZING PROCESS

Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.

METALLOGRAPHIC EQUIPMENT

Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
General Electric X-Ray Corp., 4855 Electric Ave., Milwaukee 14, Wis.

METALLURGISTS

Crobaugh Co., Frank L., 1426 West Third St., Cleveland 13, Ohio.

METERS (Gas, Air, Water)

Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.
Roots-Connersville Blower Corp., Connersville, Ind

MIXERS (Core Wash)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Multiplex Machinery Corp., Elmore, Ohio.

MIXERS (Sand and Clay)

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
St., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Co., Waterloo, Iowa.
Fordath Engineering Co. Ltd., West Bromwich, Birmingham, England.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, Ohio
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Multiplex Machinery Corp., Elmore, Ohio
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Posey Iron Works Inc., Lancaster, Pa.
Royer Foundry & Machine Co., Kingston, Pa.

MODELS (Wood)

Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

MOLD CONVEYORS

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.

MOLD COOLING HOODS

Claude B. Schneible Co., 2827 25th St., Detroit 16, Mich.

MOLD DRYERS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1531 Columbus Rd., Cleveland 13, Ohio.

MOLD OVENS and DRYERS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, O.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Newcomb-Detroit Co. Inc., 5741 Russell St., Detroit 11, Mich.
Ross Engineering Corp., J. O., 350 Madison Ave , New York 17, N. Y.

MOLD TRUCKS (Power Operated)

Clark Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.

MOLD WASH

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
Superior Flake Graphite Co., 33 S. Clark St., Chicago 3, Ill.
United States Graphite Co., Saginaw, Mich.

MOLDING MACHINES

Adams Co., Dubuque, Iowa.
Beardsley & Piper Co., The, 2424 N. Cicero, Chicago 39, Ill.
British Moulding Machine Co., Faverham, Kent, England
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Moline Iron Works, Moline, Ill.
Nichols, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5. O.
Stone-Wallwork Ltd., 157 Victoria St., London, England.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING MACHINES (Jolt)

Adams Co., Dubuque, Iowa.
Champion Foundry & Machine Co., 1553 West Madison St., Chicago 7, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5 O.
Stone-Wallwork Ltd., 157 Victoria St., London, England.
Tabor Mfg. Co., 6225 Tacony St. Philadelphia 35, Pa.

MOLDING MACHINES (Rollover)

Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Moline Iron Works, Moline, Ill.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.
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International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis
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Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5. O.
Stone-Wallwork Ltd., 157 Victoria St., London, England.
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SEPARATORS (Abrasive)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

SEPARATORS (Air, Moisture, Oil)

American Air Filter Co., Louisville 8, Ky.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Dollinger Corp., 36 Centre Park, Rochester 4, N. Y.
Jas. A. Murphy & Co., Hamilton, O.
Pangborn Corp., Hagerstown, Md.

SEPARATORS (Magnetic)

Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Dings Magnetic Separator Co., 4740 Electric Ave., Milwaukee 7, Wis.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

SHAKE-OUT MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Air Filter Co., Louisville 8, Ky.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.

SHAKE-OUT MACHINERY (Cont'd.)

Robins Conveyors, Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Royer Foundry & Machine Co., Kingston, Pa.
Simplicity Engineering Co., Durand, Mich.

SHOES (Safety)

Safety First Shoe Co., Holliston, Mass.

SHOT AND GRIT

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
American Steel Abrasives Co., Galion, O.
Carpenter Brothers, Inc., 606 West Wisconsin, Milwaukee 3, Wis.
Clayton Sherman Abrasives Co., 3896 Lonyo Rd., Detroit 10, Mich.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio.
Globe Steel Abrasive Co., Mansfield, O.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Metal Blast, Inc., 871 E. 67th St., Cleveland, Ohio.
Pangborn Corp., Hagerstown, Md.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.
Steel Shot & Grit Co., Inc., 39 Warren Ave., Boston, Mass.

SHOT (Peening)

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
American Steel Abrasive Co., Galion, O.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio.
Globe Steel Abrasive Co., Mansfield, Ohio.
Metal Blast, Inc., 871 E. 67th St., Cleveland, Ohio.
Pangborn Corp., Hagerstown, Md.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.
Steel Shot & Grit Co., Inc., 39 Warren Ave., Boston, Mass.

SHOVELS

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.

SHOVELS (Power)

Clark Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.
Frank G. Hough Co., Libertyville, Ill.

SILICA FLOUR

Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, O.
Ottawa Silica Co., Ottawa, Ill.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.

SILICOMANGANESE

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

SILICON (Briquets)

Electro Metallurgical Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, Ohio.

SILICON CARBIDE (Briquets)

Carborundum Co., Perth Amboy, N. J.

SILVERY PIG IRON see Pig Iron (Silvery)

SKIMMERS

Tamms Industries Inc., 228 N. LaSalle St., Chicago 1, Ill.

SKIP HOISTS

Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Gardner-Denver Co., Quincy, Ill.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

SLIP FLASKS

Adams Co., Dubuque, Iowa.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.

SLINGS (Chain)

Jeffrey Mfg. Co., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
S. G. Taylor Chain Co., Hammond, Ind.

SLIP JACKETS

Adams Co., Dubuque, Iowa.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Fremont Flask Co., Fremont, O.
Hines Flask Co., 3451 W. 140th St., Cleveland 11, Ohio.

SMELTERS & REFINERS

Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5.
R. Lavin & Sons Inc., 3426 So. Kedzie Ave., Chicago 23, Ill.
Niagara Falls Smelting & Refining Div., Continental-United Industries Co., Inc., 2204 Elmwood Ave., Buffalo 17, N. Y.

SNAGGING WHEELS—See ABRASIVE WHEELS

SNAP FLASKS

Adams Co., Dubuque, Iowa.
Diamond Clamp & Flask Co., Richmond, Ind.
Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.
Hines Flask Co., 3431 W. 140th St., Cleveland 1, Ohio.

SODA ASH

Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.
Hercules Powder Co., Wilmington 99, Del.
Mathieson Chemical Corp., Mathieson Bldg., Baltimore 3, Md.
Solvay Sales Division Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

SOLDER

Federated Metals Div., American Smelting and Refining Co., 120 Broadway, New York 5.

SPACE HEATERS

Dravo Corp., Neville Island, Pittsburgh 25, Pa.

SPATS (Safety)

Safety Clothing & Equipment Co., 7016 Euclid Ave., Cleveland 3, Ohio.

SPECIAL FOUNDRY ALLOYS

Federated Metals Division of American Smelting and Refining Co., 120 Broadway, New York 5, N. Y.
Niagara Falls Smelting & Refining Div. Continental-United Industries Co., Inc., 2204 Elmwood Ave., Buffalo 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

SPOT WELDING APPARATUS

Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.

SPRAY GUNS

Metallizing Company of America, 3520 W. Carroll Ave., Chicago 24, Ill.
Murphy & Co., Jas. A., Hamilton, O.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.

SPRUE CUTTERS

Adams Co., Dubuque, Iowa.
Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.
Milwaukee Chaplet & Mfg. Co., 1023 S. 40th St., Milwaukee, Wis.
Rice Pump & Machine Co., 1025 S. 40th St., Milwaukee 15, Wis.

STACKING BOXES

Palmer-Shile Co., 1600 Fullerton Ave., Detroit 27, Mich.

STEEL SHOT

Steel Shot Producers, Inc., Butler, Pa.

STEEL (Structural)

American Bridge Co., Pittsburgh 19, Pa.
Inland Steel Co., 38 So. Dearborn St., Chicago 3, Ill.

STRIPPING MACHINES

Adams Co., Dubuque, Iowa.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3228 W. Pierce St., Milwaukee, Wis.

SURFACE TREATMENT METALS

Pangborn Corp., Hagerstown, Md.

TANKS (Dewatering)

Claude B. Schneible Co., 2827 25th St., Detroit 16, Mich.

TAPER PINS

Standard Horse Nail Corp., New Brighton, Pa.

TELLURIUM

American Smelting & Refining Co., 120 Broadway, New York 5, N.Y.

TEMPERATURE CONTROLLERS

Foxboro Company, Foxboro, Mass.
Illinois Testing Laboratories, Inc., 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.

TESTING EQUIPMENT

Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.
Steel City Testing Machines Inc., 8843 Livernois Ave., Detroit 4, Mich.

TESTING LABORATORIES

Harry Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.

—When writing advertisers, please mention THE FOUNDRY—

Classified Advertising

Positions Wanted

CUPOLA OR MELTING FOREMAN

Well versed in cupola practice, good record for handling men. Good and well known references. Capable of assuming metallurgical responsibilities. Address: Box 930, The FOUNDRY, Cleveland 13, Ohio.

PLANT MANAGER OR FOUNDRY SUPERINTENDENT

Practical training in management by a company he was associated with for nineteen years. Twenty-six years of experience, ten of which were in executive capacity and all in gray iron. Experience includes jobbing, semi production, mechanized production and product manufacturing. 45 years of age, married and excellent references and recommendations are available. Address: Box 903, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Retired foundry executive desires to re-establish himself in the industry. For more pertinent details address: Box 918, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY MANAGER OR SUPERINTENDENT

Fourteen years' experience in making castings in all aluminum alloys. Can guarantee 100% x-ray on all castings and porosity free condition. Presently employed. Available May 1st. Address: Box 925, The FOUNDRY, Cleveland 13, Ohio.

WORKS MANAGER FOUNDRY SUPERINTENDENT

Thoroughly capable and of proven ability to reduce costs, reduce scrap percentage and to better quality of castings. Good handler of labor relations. Gray iron, malleable iron or steel. Address: Box 851, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY METALLURGIST

BS degree in metallurgical engineering. Experienced in producing plain carbon and alloyed steel, also plain carbon or alloyed gray iron and high strength gray iron in the electric furnace. Familiar with production of plain and alloyed high strength irons in the cupola. Know sand control and have some experience in radiography work. Address: Box 902, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN OR SUPERINTENDENT

Practical gray iron foundryman desires position as foreman or superintendent in production or jobbing. Over 30 years' proven ability as foreman and superintendent. Practical experience on cupola practice. All types of molding in green and dry sand. Squeezer rollover machines and sand slingers. Understand sand and good rigger for production. Address: Box 895, The FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

26, married. Doctorate this spring, M.I.T. Desire position in foundry or allied industry. Will consider research, development, production. Address: Box 932, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Desires position as foreman or superintendent. Practical man, gray iron, nonferrous jobbing and production. Soil pipe and farm implements. Address: Box 926, The FOUNDRY, Cleveland 13, Ohio.

PATTERN MAKER

Thirty years of the best experience, available now, would like to secure a sales position with a reliable foundry selling castings. Address: Box 912, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRYMAN

Experienced in the latest improved modern foundry operations. Thorough knowledge of improved foundry practices, plant layout, pattern and core box design, design and development of new and existing equipment for greater productivity, improved product and lower costs. Will consider West Coast. Address: Box 836, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FOUNDRY CONSULTANT

With 45 years' actual foundry experience specializing in problems of mechanical foundries, regulating production and reducing scrap. Address: Box 429, The FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRY

Supervisory capacity with 22 years' experience in all phases of steel foundry practice. Castings ranging from one pound to three tons. Methods of high speed production. Heading, gating, etc. Can give best references. Address: Box 900, The FOUNDRY, Cleveland 13, Ohio.

Opportunities

OPPORTUNITIES

Interested in contacting manufacturer who may be interested in producing and marketing a new multi-purpose hand tool. Tool calls for die-casting and light metal stampings. Tool automatically creates market for three consuming products. Ready market. Five (5) claims stand allowable as at present advised by the patent office. Royalty basis. Address: Box 935, The FOUNDRY, Cleveland 13, Ohio.

OPPORTUNITY

McLain's System course Steel Foundry Practice, pamphlet form without correspondence feature for $25, never sold for less than $75. Closing out edition.

McLAIN'S SYSTEM INC.
236 E. NORTH AVE. MILWAUKEE 12, WIS.

Available Capacity

AVAILABLE CAPACITY

Our foundry has open capacity to supply small and medium size gray iron castings. Send sample. Address: OREGON CASTINGS CO., RD 3, Lititz, Pa.

OPEN CAPACITY

For light floor and squeezer work. Address: ENTERPRISE FOUNDRY INC., 817 SO. BROADWAY, OKLA CITY, OKLA.

Wanted-To-Buy

WANTED

1—2 or 3 Crane bridges American Monorail, one ton capacity, about 22 feet long. Truss rail to support the above. Quote price in loaded condition.

3 or more Modern Equipment Co. Model F pouring devices complete with 300 pound ladles.

BOX 940
THE FOUNDRY CLEVELAND 13, OHIO

ELECTRIC FURNACES WANTED

Detroit—Electric Rocking—3 sizes
LF (100 KW), AA (400 KW), CE (600 KW)

MORRIS BEAN & CO.
YELLOW SPRINGS, OHIO

GRAY IRON FOUNDRY WANTED

Now in operation, with a good clientele and a reputation for good service and good castings. Must be at least 15,000 sq. ft. of floor space well equipped to run both jobbing and production work in the molding, coremaking and the cleaning rooms. We have at present work to use about 50% of this capacity and require a plant in A-1 shape. Plant should be located within 400 miles of Chicago all West. Address: Box 917, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Brass oil-fired tilting furnace, approximately 525 pounds capacity, stand grinders 14"-20" wheels, swing frame grinder, large Herman rollover, 36" x 42" wheelabrator. Address: Box 920, The FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

WANTED—FOUNDRY

Small nonferrous foundry with possibility for expansion, preferably in the State of Michigan by reliable person now manager of gray iron—annex brass and aluminum foundry. Address: Box 847, The FOUNDRY, Cleveland 13, Ohio.

WANTED

New condition Stroman or Fisher, oil fired, 400 lb. tilt aluminum furnace and blower in even trade for new condition Campbell-Hausfeld #1200 magnesium tilt furnace, 1800 lb. aluminum capacity, equipped with both oil and gas burners, no blower. Address: CURTO-LIGONIER CO., LIGONIER, INDIANA.

WANTED

Several #350 crucible, gas-fired, brass melting furnaces.

Several 500 pound or 1000 pound, non-crucible, gas-fired, brass melting furnaces.

Interested in Wheelabrator and/or Pangborn rotoblast for bronze foundry.

BOX 798
THE FOUNDRY CLEVELAND 13, OHIO

WANTED

Osborn No. 92 core blower, late model, air clamp. Address: Box 913, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Interest in small aluminum sand foundry. Preferably in metropolitan New York area. Invest up to $10,000. Address: Box 909, The FOUNDRY, Cleveland 13, Ohio.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

Foundries For Sale

FOR SALE OR RENT

GRAY IRON FOUNDRY. Completely equipped jobbing foundry in small town near New York City. Good building and large yard. R. R. siding.

EDWARD H. ZOLL
INDUSTRIAL PROPERTIES THROUGHOUT THE EAST
790 BROAD ST., NEWARK, N. J.

FOR LEASE GRAY IRON FOUNDRY

Eastern central Indiana, fully equipped, large working inventory, attractive lease proposition available immediately. Large profit possibility. Address: Box 736, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE—GRAY IRON FOUNDRY

Jobbing and production. 12,000 sq. ft. floor space. Well equipped molding, core, cleaning and pattern room. Central heating system. Now producing quality castings for the trade. Excellent clientele and reputation for good castings. Located centrally from Detroit, Lansing, Toledo. Real opportunity for capable and aggressive party. Require in excess of $50,000 to handle. Address: Box 870, The FOUNDRY, Cleveland 13, Ohio.

SMALL GRAY IRON FOUNDRY

Modern, fully equipped. Capacity—4 ton per day. Good proposition for the right man. Bargain at $15,000. Address: J. M. Leonard & Son, Osterville, Mass., Tel—4253.

For Sale

FOR SALE

AUTOMATIC BRINELL HARDNESS TESTER
Gogan Model 911, late type

for direct automatic Brinell depth reading for 3000 kg load

EXCELLENT CONDITION $525.00

H. H. PELZ MACHINERY CO.,
627 W. WASHINGTON BLVD.
CHICAGO 6, ILLINOIS

Classified Advertising

For Sale

FOR SALE

DUST COLLECTOR. American Air Filter type W roto clone, arrangement D. Wet system. Capacity 6000 CFM. Equipped with stainless steel impeller blades. Only slightly used. Excellent condition. Price quoted, without motor or electrical controls on request. Address: UNIVERSAL FRICTION MATERIALS COMPANY, 303 WEST RUSH STREET, KENDALLVILLE, INDIANA.

FOR SALE

1 only #406 Osborn stationary jolt rollover pattern draw molding machine—flask capacity, max. length overall 78"; width outside 50"; flask space, minimum 13", maximum 24"; jolt cylinder diameter 16"; pattern draw 18"; jolt capacity at 80 lbs.; air pressure 500 lbs.; misc. spare parts; and auxiliary equip. for feeding sand to this unit. For further information, write or call ELECTRIC STEEL FOUNDRY CO., PORTLAND, OREGON.

FOR SALE

2—Used #6 Whiting cupola melting sections only $500.00 each.
1—Roots-Connorsville positive pressure blower 18 x 63 for 40 HP motor, capacity 5600 CFM, 28.2 CF per revolution. Motor not included $500.00.
1—GE centrifugal blower 4,000 CFM with 40 HP motor type FS-347 $1,000.00.

DETROIT BRASS & MALLEABLE WORKS, 100 SO. CAMPBELL AVE., DETROIT 9, MICH.

FOR SALE

Continuous Despatch baking oven. Sectioned for loading and unloading, preheat, heating and cooling. 93'8" L, 13'W, 14' H. Link Belt conveyor; gas-fired externally, recirculating. All section have non-thru metal panels, rock wool insulated. Address: ARCOS CORPORATION, 1500 S. 50th STREET, PHILADELPHIA 43, PA., T. McGOVERN.

MOLDING MACHINES FOR SALE

8—Type R International Stationary Molding machines, size 14 x 8 with flask rests and clamps.
2—Type H Pridmore Portable machines size 16 x 14 x 8 draw with flask rests.
Equipment in very good condition.

ADVANCE ALUMINUM CASTINGS CORP.
2742 W. 36TH PL.
CHICAGO 32, ILL.

FOR SALE

TURBO BLOWERS (3 Phase, 60 Cycle)

cfm	Pressure	Make	Motor H.P.	Volts	Speed
3500	40 oz.	Spencer	60	440	1800
2200	40 oz.	Spencer	40	220/440	3600
1400	16 oz.	Spencer	220/440	3/60	3600
225	10	Spencer	1	220/440	3600

PRESSURE BLOWERS (3 Phase, 60 Cycle)

2500	7 oz.	Sturtevant	15	220/440	1800
2400	14 oz.	Mahr	15	220/440	3480
1300	16 oz.	Nth.Amer.	10	440	1800
1150	20 oz.	Nth.Amer.	10	220/440	3600
950	16 oz.	Nth.Amer.	7½	220/440	3600
800	24 oz.	American	10	220	3600
550	20 oz.	A & B	5	440	3600
450	6 lbs.	A & B	30	220/440	3450
340	20 oz.	A & B	3	440	3600
150	12 oz.	Nth.Amer.	1	220	3600

MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVENUE
CLEVELAND, OHIO

FOR SALE

Sly Dust Collector 9' x 14' x 10' complete with Roto-Clone
Dynamic Precipitator, Type D, Size 24", 50 HP Motor, with all motor controls. This equipment only in use 4 months.
U. S. Electric 10 HP 20" Swing Grinders
U. S. Electric 15 HP, 24" Swing Grinders
Elwell Parker Type I Z Electric Trucks
Whiting Tumbuling Barrel
Modern Pouring Devices
2000 Webb 4 wheel ball bearing Trolleys $5.00 each

GEORGE W. CASSADY COMPANY
P. O. BOX 238
WILLIAMSPORT, PA.

FOR SALE

Two #5 Connersville cupola blowers, 16.9 cu ft. per displacement, 4900 ft. per minute. Address: Box 894, The FOUNDRY, Cleveland 13 Ohio.

For Sale

FOR SALE

3—Compartment Armstrong Jet Blast Machine, including three exhaust air scrubbers with water spray nozzles and contacts, two 12 station air manifolds and controls, three air agitators and controls, sixteen blast gun ejectors.
1—Pangborn twin shot blast room. Two compartments each 10'0" x 10'6" x 7'6" with vestibules, abrasive handling and reclamation system, blast equipment and monorail "I" beam work conveyor with hooks.
1—Coleman core oven—portable shelf type paste drying oven suitable for drying cores complete with controls and indicator.
2—Swing frame grinders, No. 210 deluxe portable Safety Grinding Wheel and Machine Company make, complete with motors and starters.
1—Swing frame grinder, No. 18 H, complete. All have enclosed grinding booths.
1—Ransohoff Wet Mill with power loader, sand removal conveyor and tank, complete in every respect.
2—Osborn Special purpose Core machines, hydraulic draw, hand ram and roll over, built for long narrow cores.
All above equipment has had very little wear.

BOX 890
THE FOUNDRY CLEVELAND 13, OHIO

FOR SALE

149—Truscon Steel Flask—Pin on each end —12 x 16, 4 Cope & 4 Drag.
49—Truscon Steel Flasks—Pin on each end —12 x 18, 5 Cope & 5 Drag.
190—Truscon Steel Flasks—1 Pin on each end —12 x 18, 3 Cope and 3 Drag.
145—Sterling Steel Flasks—1 Pin on each side —12 x 18, 3 Cope & 3 Drag.
119—Truscon Steel Flasks—1 Pin on each side —12 x 18, 3 Cope & 3 Drag.
These Steel Flasks are practically new.
2—Tabor, Air Jolt, Rollover Machines 14 x 16 Table.
1—Pouring Device.
1—Globe Tilting Water Tumbler.
1—American Sand Cutter, Gasoline Driven.
1—Johnson & Jennings 24 x 30 Rollover.
1—Tabor 30 x 40 Rollover Machine.
1—27 x 36 Wheelabrator.
1—#9 Whiting Cupola complete with Motor, Blower, and Blast Regulator.
10—"G" Power Rollover Machines.
15—Jolt Squeezers of most any make.
1—Automatic lift truck with charger.
Osborn 558 and 559 Jolt Strippers.
J.D.P. International Jolt Strippers.

HAYNES FOUNDRY EQUIPMENT CO.
814 ADA ST. KALAMAZOO 52, MICH.

FOR SALE

COMPLETE ALUMINUM FOUNDRY
3 CAMPBELL-HAUSFELD 1,000 lb. tilting cast-iron pot furnaces (1 with power tilt)
10 new melting pots
15 ton brand new Firebrick
Air blowers, manifolds, fuel meters, hand ladles, crane, chain hoist, piping, overhead trolleys, etc.
MUST BE SOLD.

MR. ZOLLER
AIRCRAFT COMPONENTS, INC.
BENTON HARBOR, MICHIGAN

REBUILT EQUIPMENT

10—Osborne Jolt Squeezers, Type 275J
4—International R.O. 20 x 8, Type G
2—International R.O. 24 x 10, Type G
1—Herman R.O., 1500 Series

1—#40 B. & P. Speedmullor with Loader
1—13' Tractor type Sandslinger
1—300 lb. Ajax Electrothermic Melting Furnace with equipment
1—27" x 36" American Wheelabrator

RAY P. SCULLY
SCULLY MACHINERY & EQUIPMENT CO., NOT INC.
767 MILWAUKEE AVE., CHICAGO 22, ILL.
PHONE: CANAL 6-0314

FOR SALE

1 36" Willsea Heater in excellent condition. Price: $1,400.00
1 Motorblower rated FS-347-4000 CFM, 1.25# pressure—direct connected to and driven by 30 H.P. Motor—220 V.—3 Phase, 60 Cycle. Price: $850.00.
Note: Position of Blower Casing (#1)

THE WOLF COMPANY
CHAMBERSBURG, PA.

For Sale

ATTENTION CONVENTION GOERS!

While you are in Cleveland, we would be happy to show you our bargains in late model used foundry equipment. We handle Wheelabrators, Molding Machines, Sand Mixers, Core Blowers, Flasks and Jackets, complete Sand Handling Systems, Lift Trucks, etc.

BALCHER MACHINERY COMPANY
OFFICE: 1884 S. COMPTON ROAD
TELEPHONE: FAIRMOUNT 1-1186
WAREHOUSE: 15301 SCHOOL AVE.
TELEPHONE: GLENVILLE 1-1588
CLEVELAND, OHIO

FOR SALE

One Ingersoll Rand Type FS-563 blower direct connected and roller pedestal bearing construction serial #S563-J-10, 11,000 CFM, 1.5 lbs. pressure, 3500 RPM complete with 100 HP Fairbanks Morse motor type QZC, frame RK 505 serial #567765, 3450 RPM. This equipment used only a short time and like new. Price $6,500.00.

NEW HAVEN FOUNDRY
NEW HAVEN, MICHIGAN

FOR SALE

A reasonable offer will get you a modern sand handling system consisting of 19 individual moulders' hoppers, two 25-ton sand storage bins, one #50 Beardsley & Piper speed muller with 40 HP Motor, magnetic separator with bucket elevator, overhead monorail system and cab controlled electric hoist and monotractor and shell buckets with automatic trips for delivering sand from speed muller to moulders' hoppers.

OLD COLONY FOUNDRY COMPANY
EAST BRIDGEWATER MASSACHUSETTS

FOR SALE

Sand mixer-J. H. Day Co. "Imperial" double arm belt driven with tilting bowl. Address: PLANT EQUIPMENT COMPANY, CINCINNATI 3, OHIO.

FURNACES — OVENS — TANKS SURPLUS

—OUTSTANDING VALUES—

ECLIPSE 7AD AIR DRAW FURNACE, Gas Fired, 1250° F. basket, 25" dia. x 28" deep, 10' RX GENERATOR—MODEL LD #310, 3600 ft. capacity
ELECTRIC FURNACE TYPE EF, 90 KW special atmosphere, Thermocouple
HAYES TYPE HG-64 ELECTRIC FURNACE, 1800° F.-2500° F. 8" x 12" x 18"
HAYES TYPE LR-62-R FURNACE, 1850° F., 8" high x 12" wide x 24" long
LINDBERG #2226 VERTICAL TYPE ELECTRIC CYCLONE TEMPERING FURNACE, 150°-1500° F., 54" W. x 64" L. x 77½" H.
LINDBERG T-122410-HY HYDRYZING FURNACE, TUBULAIRE BOX TYPE, 2000° F., Chamber 12" wide x 24" deep x 12" high
LINDBERG T-153012-HYT HYDRYZING FURNACE, 2000° F., chamber 15" W. x 30" D. x 12" H.
LINDBERG T-243618-HY HYDRYZING FURNACE, TUBULAIRE BOX TYPE, 200-2000° F., Chamber 24" wide x 36" deep x 16" high
LINDBERG T-521-2 TUBULAIRE ROTARY HEARTH HYDRYZING FURNACE, 27 KW., 230 volts, 200-2000° F.
HOLDEN SALT HARDENING FURNACE, capacity 450# per hour; with tanks
SALEM (THE ELECTRIC FURNACE CO.) GAS FIRED RADIANT TUBE HEATED PUSHER TYPE, RETURN RECUPERATIVE FURNACE for annealing, temperatures from 1400° and 1650° F.
SURFACE COMBUSTION LARGE OVEN FURNACE, LO-48-72-C, 2200° F., 36" opening

Many other types of furnaces, tanks, etc.

ALL FOR IMMEDIATE DISPOSAL AT ATTRACTIVELY LOW PRICES—INVESTIGATE!

JACK & HEINTZ PRECISION INDUSTRIES,
17600 BROADWAY, CLEVELAND 1, OHIO
Phone Broadway 1-1000 Ext. 220, 219

Classified Advertising

For Sale

FOR SALE

1—Tabor Handram Power Rollover Hydraulic Molding Machine 30" table ser. #24818.
8—Tabor Power Rollover Molding Machines 22" table.
3—Osborn Rollover Hydraulic Box Draw Molding Machines New 20" x 40" x 12" x 8" draw. Model 147.
2—405 Osborn jolt rollover and pattern draw Molding machines.
2—275 J Osborn portable jolt squeeze molding machines.
3—#94 Osborn Core Blowers like new, with extra head.
2—Tannewitz Metal Saws size G1E with 10 HP 220/440 V. motor like new.
1—Tabor cutoff saw with 10 H.P. Motor 220/440 V.
1—#500 Fisher Motorized Nose Pour Crucible Furnace complete with blower. A-1 condition.
10—#1000 Fisher automatic tilting furnaces latest models.
8—#500 Monarch hand tilting furnaces.
5—#1000 Monarch hand tilting furnaces.
8—#500 Monarch dip furnaces.
1—#125 Hausfeld combination gas and oil fired with blowers.
1—#125 BBI Fisher hand tilting crucible melting furnace, gas fired.
6—3 H.P. to 10 H.P. blowers for furnaces
2—10 H.P. double arbor grinding stands, used for aluminum castings.
65' Bucket elevator with 10 H.P. 220/440 V. motor, buckets 12" x 8" x 7" like new.
One 1 ton capacity "Lectromelt" furnace, complete with all controls. High voltage 13200 volts. All instruments in good condition.
1—JM-18 Champion rollover core machine.
1—JM-21 Champion rollover core machine.
1—4 ft x 6 ft Robins vibrating shakeout with 10 H.P. motor.
1—Roto-clone type W-A No. 30 25 H.P. 1750 RPM.
1—Northern blower type BA-12 10 ft x 6 ft.
1—3 ton Elwell Parker Hi-lift platform truck—gas-electric, powered by 4 cyl., ready power unit.
3—5 ton Elwell Parker Hi-lift platform truck—gas-electric, powered by 4 cyl. ready power unit.
10—Ingersoll Rand air hoist 1 ton and 2 ton capacity.
Steel flasks, popoff flasks, snap flasks, jackets, bands, core plates.

EUCLID FOUNDRY & MACHINE EQUIPMENT CO.
15019 SARANAC RD. CLEVELAND 10, OHIO
TELEPHONE—GLENVILLE 1-1222

FOR SALE

1—Pangborn 9' diameter "LG-14" practically new, Multi-table rotoblast machine, complete including all motors, etc.

1—Dust collecting system

1—Lot spare parts

10—tons No. C-120 metallic grit used in this equipment.

THE UDYLITE CORPORATION
2501 E. GRAND BLVD., DETROIT 11, MICH.
C. A. SHAFER, DIRECTOR OF PURCHASES

FOR SALE

Diesel Locomotive Crane 25 Ton-Industrial Brown hoist
Electric Arc Furnaces
Swindell—1 Ton
Electromelt—½ Ton
Electromelt—3 Ton
Wheelabrator, Table Type
IR Compressor 75 HP-350 CFM
Gardener #6 and #7 ½, 15 HP, Double-End Disc Grinders
Diesel Locomotive Crane 25 Ton
Fork and Platform Lift Trucks, Ready Power
Write for Circular!

WEBER MACHINERY COMPANY
1801 EAST 21 STREET
CLEVELAND, OHIO
CHERRY 1-7057

For Sale

GOOD USED EQUIPMENT

Sly Dust Collecting System, consisting of 3 Sly #62 Dust Filters to handle 15,000 CFM each. Motors 220/440 volt, 3 phase, 60 cycle. Was erected, but not used.
2—5-ton Bridge Cranes, 30' span, 3 motor, cab operated, 230 volt DC, equipped with Magnet controller and enclosed cab.
1—3-ton Shaw, 44'5" span Crane with load lifter hoist, 220 volts, 3 phase, 60 cycle, floor controlled.
1—5-Ton, Ingersoll-Rand Air Hoist, with monorail trolley.
1—#2 Packer-Matic, 12 Station, Rotary Buffing and polishing machine.

IRA C. JORDAN
2508 EAST BELLEVIEW PLACE
MILWAUKEE 11, WISCONSIN

MAGNESIUM FOUNDRY EQUIPMENT

The equipment of our magnesium foundry at Adrian, Michigan is for sale.
Equipment may be inspected on and after May 1st.

BOHN ALUMINUM & BRASS CORP.
1400 LAFAYETTE BLDG., DETROIT 26, MICH.

CRANES & LADLES

25 ton cap. Orton locomotive crane, 50' boom, serial 43115 year 1928, std. gauge.
35 ton Morgan bridge crane 70' span, D.C., with 10 ton cap. aux. trolley.
35 ton cap. Ladle, bottom pour
5 ton cap. Ladle, bottom pour
3 ton cap. Shaw 44' span bridge crane, A.C. floor control.

ALLSTATES EQUIPMENT CO.
343 S. DEARBORN ST. CHICAGO 4, ILL.
PHONE: HARRISON 7-1821

FOR SALE

2—Cupola 63" shells complete with charger, blower, and Foxboro controls.
3—Ingersoll Rand Air Compressors
1 10 x 10, 40 HP.; 1 XORB, 50 HP.; 1 XRB, 75 HP.
1—Simplicity Shakeout 4' x 8' practically new. All sizes of Hines Flasks and Jackets, some new.
1—Wet Dust Collector
Cleveland Tramrail cranes, runways and monorail, also electric and air hoists.
1—#10 Morley Cooling Tower, new.
Air Rammers and Air Chisels, just rebuilt by the factory with 1 year guarantee.
Conveyor belts, 24", 20", 15½", 11" wide
18—Cylindrical pouring ladles
2—SPO, Model 211B, jolt squeeze pin lift, serial #151-152
1—International, 14"—5½", PKL, Serial #43999
2—Milwaukee, jolt squeeze swing head, model 123-10 Serial #12948
4—SPO, model 2114 G, jolt squeeze pin lift, 11" Cylinder, serial #163, 164, 165, 166
International, Model 255, hand roll over Core making machine
1—Demmler #55 Core Blower machine.

THE BARDES FORGE & FOUNDRY COMPANY
2619 COLERAIN AVENUE
CINCINNATI 14, OHIO
TELEPHONE—KIRBY 4224

For Sale

FOR SALE

MOLDING MACHINES
1—74W Osborn Plain Squeeze Portable
2—75W Osborn Plain Squeeze Portable
3—75J Osborn Jolt Squeeze Portable
3—Federal RAPID Jolt Squeeze Portable
2—SPO #611B Stationary Oscillating Jolt Squeeze Strippers
1—SPO #4½ JHS Air Jolt Hand Strip
BLOWERS FOR CUPOLAS AND FURNACES
1—Piqua Rotary Pressure Blower, rated 19 cu. ft per Rev.
Maxon-Premix Blowers for Gas, ¼ to 1 H.P.
METAL MELTING EQUIPMENT
1—Hausfeld 2000# Aluminum Capacity Furnace, Barrel Type, open flame, oil fired
2—Monarch-Rockwell Rotating 500# Brass, Oil
New 32" to 41" Dia. shell Cupolas made to order
TUMBLING MILLS AND SAND BLAST
1—Pangborn No. 2 GH direct pressure type sandblast barrel, motor driven. Complete Unit.
1—Pangborn Sand Blast Unit, including generating tank, shot cleaner, bucket elevator. Suitable for use with room
1—Pangborn Type EN-2 Sand Blast Cabinet, suction type, 5 x 3 x 7' high
MISCELLANEOUS
1—Continuous Heat Treat Furnace 57' long 1200° F Max.
5—Koch electrically heated ovens for baking cores, 4½ ft. wide, 6 ft. high, 6 ft. deep, complete with recirculating fan and controls.
1—Young Bros. Tower Core Oven, 5 ft. x 1 ft. shelves, gas fired, complete with Foxboro control.
1—Young Bros. Batch Type Recirculating Hot Air, gas fired, Core Oven, 5 ft. x 6 ft. door opening, 9 ft. deep.
3—Foundry Equipment Co. sliding shelf core ovens with five 30 x 42" shelves, 8" high, gas fired.
1—Lamson Endless Mold Conveyor, 100 ft. long x 16 ft. wide, with 19 x 26" pallets, 36" on centers
1—Bucket Sand Elevator, 50 ft. tall, complete
4—Heavy Duty Flexible Shaft Grinders 2 H.P.
Ingersoll-Rand Air Hoists 1, 2, 3 and 5 ton Capacities

CLIFTON MACHINERY CO.
1023 W. SIXTH ST. CINCINNATI 3, OHIO

CLEARANCE BARGAINS

NUMEROUS ITEMS OF EQUIPMENT INCLUDING:

2—21' Span cramer complete
2—U. S. model 64 4-speed grinders
1—Foxboro control complete new
1—American sandcutter model M Ser 325
1—Ingersoll Rand compressor type 10 37½ HP Motor
1—Parsons #118 dust arrestor
1—Cleveland #2100 tramrail system
3—SPO #506 jolt rockover
3—SPO #2136 jolt squeeze strip
4—#275-J Osborn squeezers

LOCATED IRONTON, OHIO
BOX 943
THE FOUNDRY CLEVELAND 13, OHIO

SAND BLAST EQUIPMENT

Pangborn 28 GK2 Rotoblast Barrel, complete with Loader and $4,000.00 spare parts. A-1-Condition.—$5,000.00.
Pangborn 7GK2 Rotoblast Barrel with Loader, used very little.—$3,950.00.
Pangborn Direct Pressure Tank, Model AQ1, Excellent condition.—$575.00.
Wheelabrator No. 2 Tablast. Good condition—$3,000.00.
Wheelabrator Tumblast 15 x 20, with dust collector, $1,250.00.
Sly Sand Blast Double Room, 8 x 8, 30% of list price.
Sand Blast Cabinets and Dust Collectors, all kinds and sizes, like new, 40% of list price.
If you are interested in savings of 25% to 70% on your Sand Blast replacement parts (Wheelabrator, Pangborn, etc.) write imediately, stating type, size of your Sand Blast Machine (Tumblast, Tablast, etc.) and we will mail listing of parts available for your equipment.

DIAMOND SANDBLAST CO.
5654 W. JEFFERSON AVE.
DETROIT 9, MICHIGAN

Classified Advertising

For Sale

FOR SALE

3—Simpson intensive mixers, 1—No. 2 and 2—No. 1½ each with motor and reducer drive, motor driven National vertical charging hoist and Maxon burner, rotoclone and motor driven exhauster. Each mixer has equipment for drying while mixing but can be operated as standard units.

CONSOLIDATED PRODUCTS CO., INC.
13-20 PARK ROW NEW YORK 7, N. Y.
PHONE: BARCLAY 7-0600

FOR SALE

1—1000 lb. covered and insulated single shell geared holding ladle—Mfg. by Modern Equipment Co.

1—Cupola Blower No. 2450-14T—V belt drive—Mfg. by Power Engineering Co.

1—Gardner Disc Grinder 54" No. 24 Horizontal with motor and grinding wheel.

2—J. & J. #815-B Air Jolt Clamp Leveler Roll-over-Pattern Draw 30" x 40"-15" draw molding machines.

1—50 HP American Elec. Motor 1800 RPM 3 ph. 60 cy 440V.

All above equipment in good condition—some never used.

STILLMAN FOUNDRY COMPANY
GRAND RAPIDS 4, MICH.

FOR SALE

Two Herman rollover molding machines in excellent condition. Size 40 x 58" 3740 pounds rollover capacity suitable for foundry equipped with sandslinger. Offered at bargain price. Address: Box 861, The FOUNDRY, Cleveland 13, Ohio.

For Sale

EQUIPMENT FOR SALE

1—Demler Core Blower
5—Osborn 601 Rollovers
1—Mulbaro
1—Fisher Tilting 4 Burner Gas Type SS1, 400 Melting Furnace
1—Mummert Dixon Swing Frame Grinder
1—Clearfield 4 ft. Muller
2—Sandcutters, 48" & 72"
SIX ACRES OF EQUIPMENT
Send for our new list #11

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 E. BROAD ST.
SHILLINGTON, READING, PA.
PHONES 3-0311 4-0146

Employment Service

SALARIED POSITIONS
$3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (40 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
101 DUN BLDG. BUFFALO 2, N. Y.

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$3,000-$25,000. This reliable service, established 1927, conducts confidential negotiations for high-grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.

Employment Service

EMPLOYERS
ESTABLISHED 1922

Specializing in thorough screening of qualified personnel for any phase of operations in gray iron, steel, malleable, all non-ferrous and permanent mold foundries.

APPLICANTS:

If you can furnish QUALIFIED references, attesting to your CAPABILITY and DEPENDABILITY, your application will be accepted and we will secure for you the desired position.

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(Partial Listing)

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GENERAL FOREMEN
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MOLDER FOREMEN
CLEANING ROOM FOREMEN
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SR. INDUSTRIAL ENGINEERS
JR. INDUSTRIAL ENGINEERS
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PERM. MOLD FOREMEN
PATTERN FOREMEN
MASTER MECHANICS
PLANT ENGINEERS
MAINTENANCE SUP'TS.
MAINTENANCE FOREMEN
LABOR FOREMEN
METALLURGISTS
CHEMICAL ENGINEERS
CHEMISTS
PRODUCTION CONTROL
SALES ENGINEERS
ACCOUNTANTS

If you are experienced in any phase of foundry operations—and desire to improve your future working conditions:

WRITE
EMPLOYERS SERVICE BUREAU
6 NORTH MICHIGAN AVE., SUITE 708
TELEPHONE: FInancial 6-1155
CHICAGO 2, ILLINOIS

CLASSIFIED ADVERTISING RATES

POSITION WANTED—Minimum advertisement set solid, 30 words, $2.00. Additional words 7c each.

ALL OTHERS—"Help Wanted"—"For Sale"—"Wanted"—"Personals"—"Services", etc., minimum advertisement set solid, 30 words or less, $4.00. Additional words 12c each.

NOTE—If replies are to be sent to a box number in care of THE FOUNDRY, add 6 words to your advertisement for box number and address.

Any advertisement set in all capital letters, add 50% to the above rates.

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Single Column 2¼" Wide	One Time	Three Times	Six Times	Twelve Times
1 inch	$ 12.00	$11.00	$10.00	$ 9.00
2 inches	21.75	20.00	18.25	16.75
3 inches	32.00	29.25	26.75	24.00
4 inches	40.00	36.75	33.25	30.00
5 inches, ½ col.	48.00	44.00	40.00	36.00
6 inches	58.75	53.25	48.00	42.75
7 inches	66.00	60.00	54.00	48.00
8 inches	73.25	66.75	60.00	53.25
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Remittance should accompany advertisement when submitted—Cash Discount 2%, 10 days.

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Penton Building, Cleveland 13, Ohio

Late Type
High Grade
Heavy Duty

MACHINE TOOLS, PRECISION TOOL ROOM EQUIPMENT, PRODUCTION MACHINERY, FOUNDRY EQUIPMENT CRANES & SHOP EQUIPMENT

of the

FULTON IRON WORKS COMPANY

1259 DELAWARE AVE., WELLSTON—A Suburb of

ST. LOUIS, MISSOURI

to be Sold by Order of the Board of Directors at

PUBLIC AUCTION!

TUE., & WED., JUNE 6th-7th, 1950

Starting at 10:30 A.M. Each Day
Everything will Be Sold Piece by Piece
No Confirmation Required—Immediate Delivery

HEAVY DUTY AND TOOL ROOM MACHINERY:

Cincinnati Hypro 120″ x 96″ x 34′ Double Housing Planer; Cincinnati Hypro 72″ x 72″ x 34′ Open Side Planer; Cincinnati Hypro 10′ Vertical Boring Mill; 2 Giddings & Lewis No. 560F and No. 45—4½″ and 6″ Boring Bars; Sellers 5″ Boring Bar; Niles 6″ Boring Bar; Barret 7″ Boring Bar; Lucas 3″ Boring Bar; 8 Gray, Niles and Betts 120″, 60″, 48″, 43″ and 42″ Double Housing Planers; 7 Lodge and Shipley, American, Putnam, Niles and Bridgeport 24″, 36″, 42″, 48″, 54″ and 60″ Geared Head and Plain Engine Lathes; Newton Rotary Planer; 2 Fulton 500 Ton and 1500 Ton Hydraulic Presses; 7 Cincinnati-Bickford Super Service and American Hole Wizard 3′, 6′ and 7′ Radial Drills; 15 American "Pacemaker", Monarch G. H., South Bend, American and Lodge and Shipley Precision and Tool Room Lathes; 5 King, Bullard and Colburn 32″ to 72″ Vertical Boring Mills; 5 Warner-Swasey and Gisholt 2A, 1A, No. 3 Plain and 3L Turret Lathes; 2 Gleason Gear Planers; 5 Milwaukee and Cincinnati Milling Machines; Rockford Shaper Planer; Do All Saw; Landis Grinder; Key Seaters; Threaders; Power Saws; Shapers; Slotters and many other machine tools.

FOUNDRY EQUIPMENT:

Hydroblast Cleaning System; Beardsley & Piper Model S455 Sand Slinger; Hermon 7′ x 10′ Jarring Machine; Herman Jolt Rollovers; Jeffery Flask Filler; Simplicity "D" Shake-Out; Simpson Sand-Mixers and Mullers; Clearfield Sand Mixer; Coleman "Transtrack" Core Ovens; Rod Straightener; Inclined Shake-Out unit; Whiting Cupolas; Connersville Rotary Blowers; Royersford Screens; Conveyors; Niles Forging Hammer; Foundry Grinders; Track Scales; Foundry Scales; Foundry Supplies and Tools.

14 OVERHEAD CRANES
from 5 Ton to 30 Ton Capacity
Powerhouse Equipment—Air Compressors
Material Handling Equipment

NOTE: The Fulton Iron Works Company, now in its 98th year, is continuing its business. This sale is for the purpose of disposing of machinery and equipment only. All other operations of the Fulton Iron Works Co. will continue as heretofore.

For Detailed, Descriptive Circular, WRITE-WIRE-PHONE

SAMUEL L. WINTERNITZ & CO.

Auctioneers • Liquidators • Appraisers

FIRST NATIONAL BANK BLDG. **CHICAGO 3, ILLINOIS**

SEE 'EM WORK AT THE SHOW . . .

AJAX

LO-VEYORS

BOOTH 1220

Upper Lakeside Hall

See with your own eyes, how Ajax Lo-Veyors simplify, speed up, cut costs and take headaches out of handling sand for foundrymen.

Working models will show you how Ajax Lo-Veyors can be installed on your floor, below your floor or suspended from your wall or ceiling.

Widely used in foundries for long runs, short runs, raw sand, hot sand, and small castings — see 'em work at the show in Cleveland.

AJAX FLEXIBLE COUPLING CO. INC.

Westfield, New York

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Newest Achievement in CARL-MAYER VERTICAL CORE OVENS

Only Carl-Mayer Vertical Core Ovens, with the heating system described, are protected by Patent No. 2,257,180. Other patents pending.

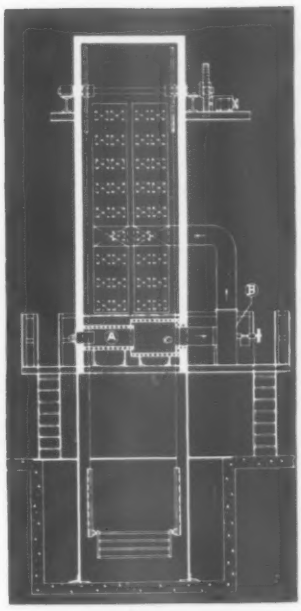

Fig. 1

OLD METHOD *with heat fan external to oven.*

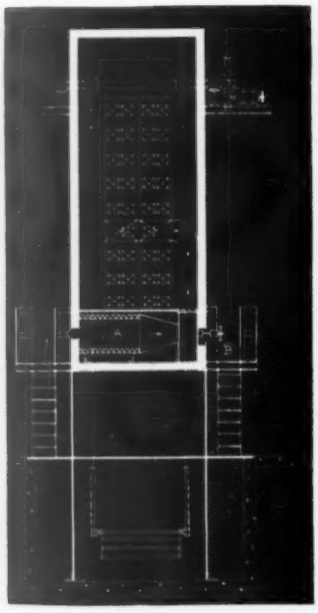

Fig. 2

NEW METHOD *with heat fan inside oven.*

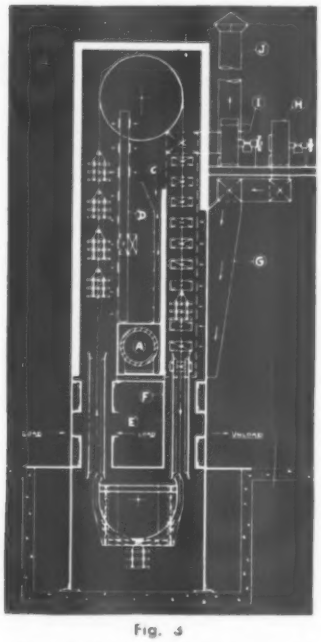

Fig. 3

Section showing conveyor travel thru pass, heating, cooling and exhaust system.

Typical Users of Carl-Mayer VERTICAL OVENS

Aluminum Co. of America
Burt Foundry Co.
Cadillac Motor Co.
Eclipse Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
General Motors Corp.
General Steel Castings Co.
Harrison Radiator Co.
Henry Kaiser
H. B. Salter Co.
McKinnon Industries
Quality Castings Co.
Packard Motor Co.
Richmond Radiator Co.
Union Brass and Metals Mfg. Co.
West Michigan Steel Castings Co.
A. C. Williams Co.

Vertical Ovens (Figs. 1, 2, 3) are by Carl-Mayer, using the universally adopted recirculating heating system with sealed combustion chamber located between conveyor chains.

CONSIDER THIS HIGHLY IMPORTANT NEW DEVELOPMENT OF LOCATING THE HEAT FAN INSIDE OF OVEN (Figure 2).

New added advantages are as follows:

(1) Saves platform space.

(2) Eliminating external duct reduces heat losses.

(3) Placing heat fan in oven also reduces heat losses.

(4) Elimination of external heat duct and fan insulation results in lower installation cost.

(5) Oven appearance is greatly improved.

OTHER FEATURES:

Guaranteeing—Faster Baking, Lowest Fuel Consumption, Smaller Core Losses, Safer Operation, Elimination of Smoke, Cooled Cores at Unloading Station, Reduced Labor Cost.

- The sealed combustion chamber (A) prevents hot combustion gases (1,200° or over) from going directly into the oven chamber, preventing non-uniform temperatures and burned cores.
- The alloy or refractory combustion chamber (A) located between conveyor strands, saves space as compared with vertical oven designs locating the heater external to the oven.
- The heat fan (B) takes the heated air from the combustion chamber and after tempering with fresh and recirculated air from duct (C) delivers it to the vertical plenum chamber (D). Result: Fast, uniform circulation of heated air—faster baking.
- Plenum chamber (D) is arranged to insure uniform cross flow of heated air over each passing carrier shelf of cores. Result: Uniform fast baking.
- The "Thru-Passage" (E) properly designed is on old practice used in ceramic drying. Permits loading from inside as well as outside.
- Arrangement of "Thru-Passage" as designed by Carl-Mayer, with partition (F), facilitates loading from both inside and outside of oven but limits the unloading to one side. This is a proven forward step, permitting adequate and fast unloading without the temptation to unload from the inside as well, with its resultant interference with loaders and danger of damaged cores.
- Cooling duct (G) and cooling fan (H) designed according to oven height and loading conditions, assure a uniform flow of cooling air across the cores on the down side to obtain maximum cooling.
- Cooling exhaust system, with cooling exhaust fan (I) and collector ducts, assures prompt and safe removal of combined cooling and exhaust products and smoke from the baked cores.
- Exhaust stack (J) utilizes the spent work of the cooling exhaust fan to further remove fumes and to prevent pocketing of any explosive gases.

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Core and Mold Ovens—all types. Backed by over 30 years' experience

CHARGING THE LARGE-DIAMETER CUPOLA

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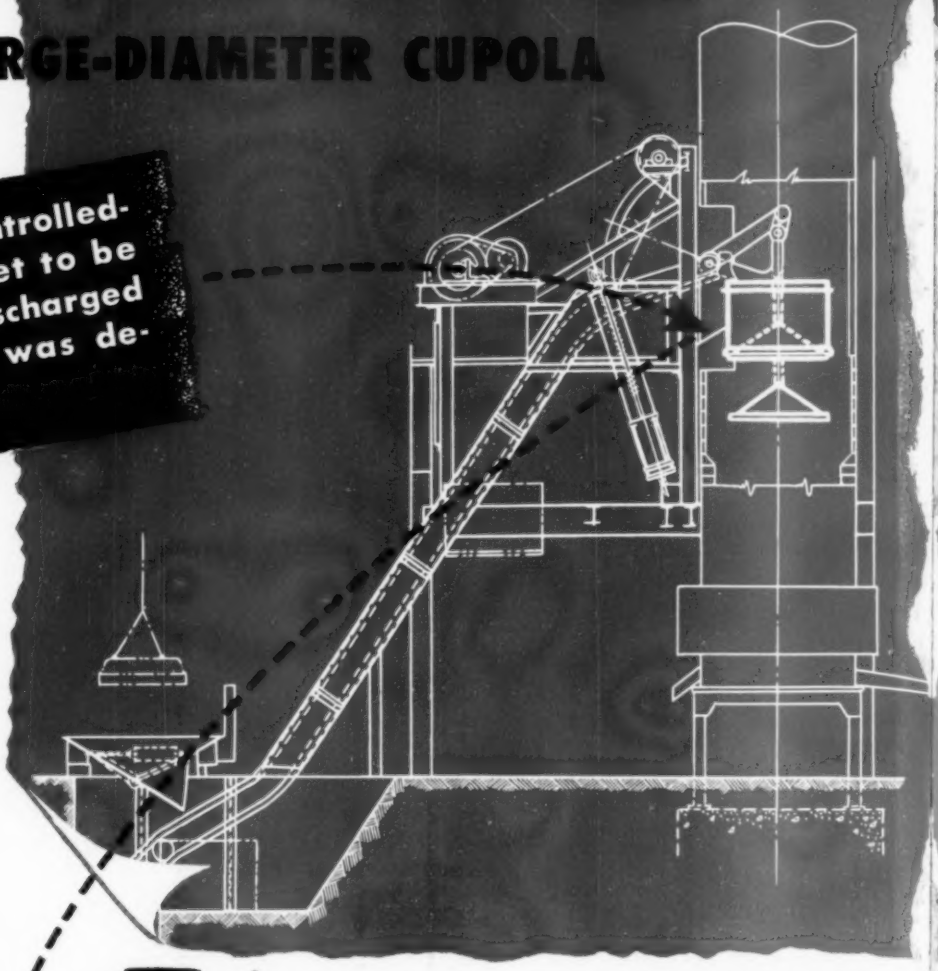
The FIRST Full-Cone Type, Controlled-Discharge Charging Bucket to be mounted in a Skip, and discharged without cupola support, was developed by MODERN.*



These early Full-Cone Type Buckets, of which there are many installations, are still giving satisfactory service in daily operation. In the meantime, MODERN* has continued to develop the Cone Type Charging Bucket for large-diameter cupolas to its present high level of efficiency . . .

Today-

The NEW Square-Top, Small-Cone Type, Side-Discharge Bucket by MODERN* . . . successor to the early Full-Cone models . . . is proving its higher charging efficiency in actual foundry operation.

Patents Applied For

Mechanically superior, this new Square-Top, Small-Cone Type Bucket produces metallurgical results which foundrymen have long wanted from large-diameter cupolas. Its *small-center cone* and *large side discharge doors* produce an even charge in the stack — with a loose center and compact sides — permitting air to penetrate to the center of the charge. Higher melting rates and "better metal" are reported by users.

Ask the MODERN* Representative in your area, or write for Catalog 147-A and Bulletin CC 8-49.

* MODERN EQUIPMENT CO.

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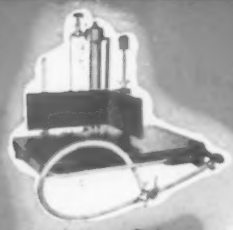
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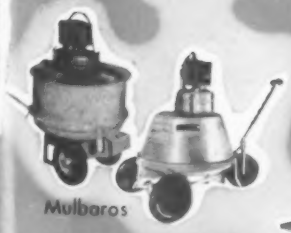
Molding Machine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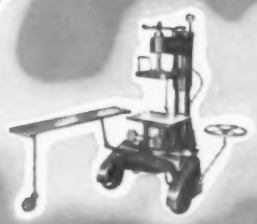
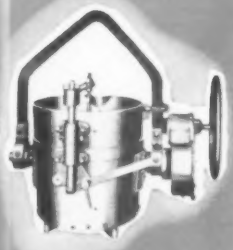

Molding Machine

Stevens Natural Draft Furnace

Gyratory Riddle

Core Blower

Core Cutting Off Machine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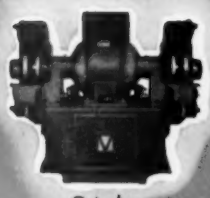
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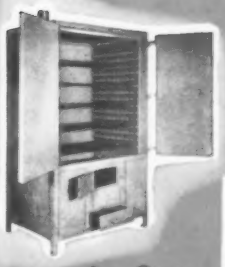
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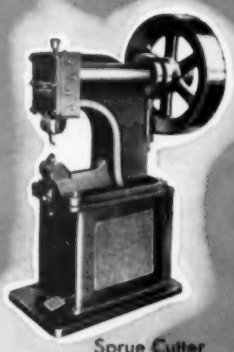
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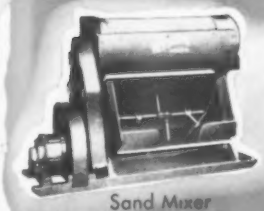
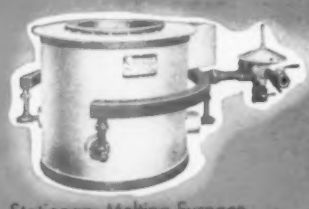

Sand Mixer

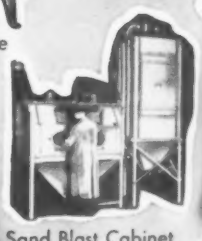
Sand Stove

Tilting Crucible Furnace

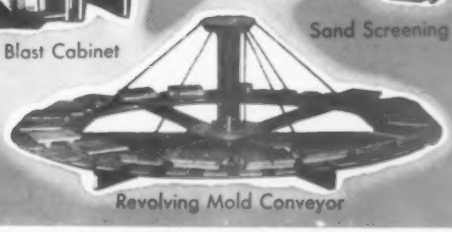

Stationary Melting Furnace

Nose Pouring Tilting Crucible Furnace

Tumbling Mill


Sand Blast Cabinet

Sand Screening Unit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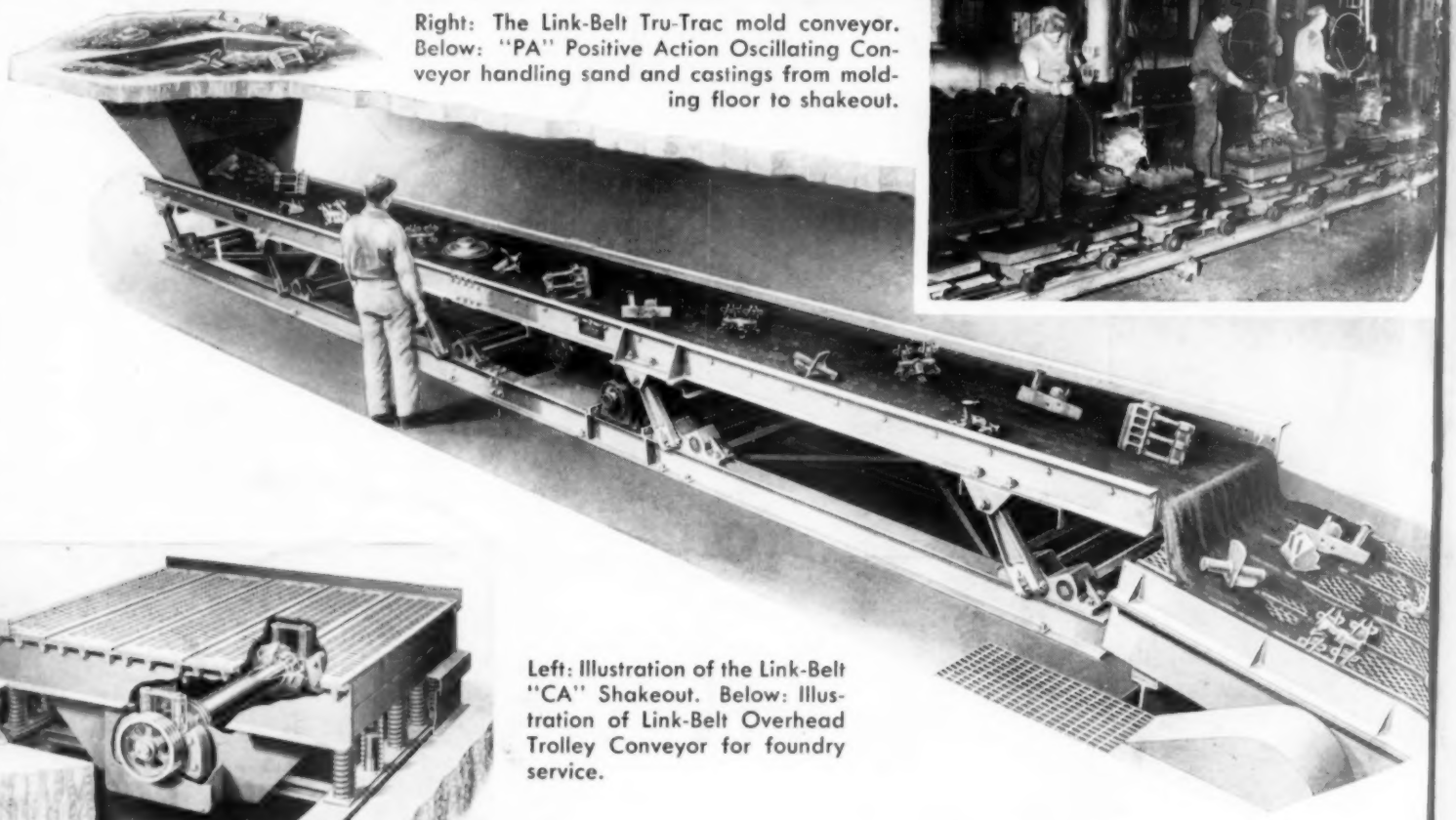
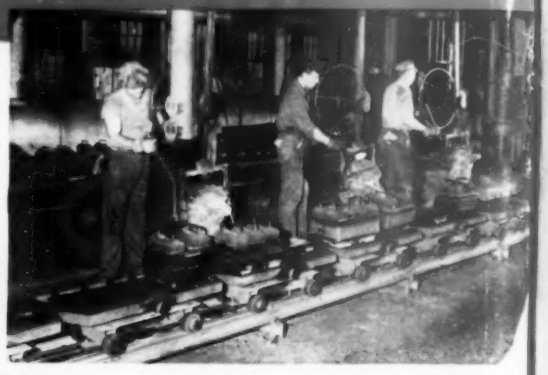
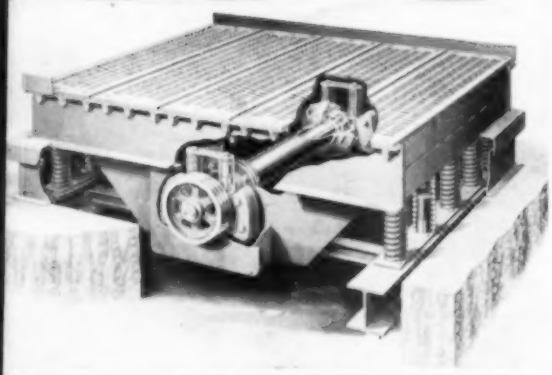


Right: The Link-Belt Tru-Trac mold conveyor. Below: "PA" Positive Action Oscillating Conveyor handling sand and castings from molding floor to shakeout.





Left: Illustration of the Link-Belt "CA" Shakeout. Below: Illustration of Link-Belt Overhead Trolley Conveyor for foundry service.

Link-Belt is installing equipment for more and more foundries that realize that they must modernize for lower costs, better working conditions and better quality of castings.

At Space 1422 at the Foundry Show (Cleveland, May 8-12), you will see in operation modern Link-Belt equipment such as the "CA" Shakeout and the Oscillating Conveyor. In addition there will be shown a section of Link-Belt Tru-Trac Mold Conveyor, Overhead Trolley Conveyor; and colored murals of Link-Belt sand, mold and castings handling installations in malleable iron, gray iron, steel and non-ferrous foundries.

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